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AN INVESTIGATION OF COMPREHENSION MONITORING BY AVERAGE AND LEARNING DISABLED READERS

by

YVONNE MARIE THOMAS

©

A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "An Investigation of Comprehension Monitoring by Average and Learning Disabled Readers" submitted by Yvonne Marie Thomas in partial fulfilment of the requirements for the degree of Master of Education.

Grace Malicky
Supervisor

Date November 10, 1983

ABSTRACT

Numerous studies on learning disabilities have shown that learning disabled children do not spontaneously use corrective strategies, although they possess these in their repertoire and can execute them when directed to do so. Since it is possible that the reason these children do not independently use corrective strategies is that they are less able than their normal peers to recognize when they have not understood, this study was undertaken to compare the abilities of average and learning disabled children to monitor their comprehension. A reading task was utilized, which tested average and learning disabled children on: (a) recognition of miscomprehension, (b) knowledge of a lookback strategy, and (c) effective use of a lookback strategy.

Twenty average grade four and twenty sixth-grade learning disabled subjects from schools within the Edmonton Catholic School District participated in the study. They were selected on the basis of comprehension scores on the Gates-MacGinitie Reading Test, Level C, Form 2, Canadian Edition (1980) and non-verbal scores of the Canadian Lorge-Thorndike Intelligence Test, Level B, Form 1, (1967). I.Q. and reading level were held constant.

Since the effect of passage level on comprehension monitoring was also of interest to the study, two stories from the Martin Mooney Mystery Series were selected and modified so that one was at instructional level for all of the subjects, while the other was at frustration level. Subjects were requested to silently read each story to answer questions. Four questions at each level had been designed to induce readers to use a lookback strategy, and the placement of story pages in front of the child ensured the easy observation of lookback behavior. Spontaneous monitoring during story reading was also recorded in a thinking aloud task wherein readers stopped reading upon reaching red dots placed in the text and reported any problems they might be experiencing.

The statistical analysis of the data included t-tests for independent means, and two-way analyses of variance with repeated measures across passage levels. The quantitative analyses were supported and/or advanced whenever appropriate by qualitative data obtained from the response sheets and notes kept on each subject.

Findings indicated that average readers were more cognizant than learning disabled readers of occasions of miscomprehension on one measure of monitoring when reading both instructional and frustration level passages. No significant differences were found between reading achievement groups on awareness of miscomprehension of questions, knowledge of a lookback strategy, and effective use of the strategy. Both reading groups were found to have good verbal knowledge of the strategy, although they were inconsistent and largely ineffective in its use. Effectiveness and frequency of lookback strategy use improved on a cued task, however, suggesting greater capacity than was indicated in the spontaneous condition.

Support for the effect of passage levels on comprehension monitoring was obtained through several qualitative measures for each aspect of comprehension monitoring, although significant differences on measures submitted to statistical analysis were obtained only for the ability to judge the accuracy of responses to questions. Implications pertaining to the findings were provided for classroom teachers, and suggestions were made for future research.

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CHAPTER I

INTRODUCTION

> "A vital component of reading comprehension is the ability to monitor or judge the quality of one's understanding. This [entails keeping track of one's ongoing comprehension success, ensuring the process continues effectively, and taking remedial steps when necessary.]"
>
> (Baker and Brown, in Pitts, 1983)

The need to monitor one's comprehension is integral to contemporary theories of reading in which the reader is seen as an active participant in his/her own learning. Comprehension monitoring in these theories acts as an "executive function, essential for competent reading, which directs the reader's cognitive processes as he/she strives to make sense of incoming textual information" (Wagoner, 1983). The reader in this model has at his/her disposal a repertoire of corrective strategies with which to rectify his/her misunderstanding when he/she experiences difficulty assimilating the new information into his/her existing body of knowledge.

This view of reading as an active process, in which the reader is largely in control of his/her comprehension, offers an alternative view of disabled readers. From this view, the disabled reader is envisaged as possessing intact psychological processes (such as memory or perception) and differing from his/her more capable peers in ability to monitor ongoing understanding of what he/she reads and/or in ability to use cognitive strategies in order to rectify misunderstanding.

Support for this theory has been secured by numerous researchers such as Torgensen (1977), Wong (1980), Flavell (1979), and Brown (1978). In comparative studies of learning disabled and average children they have found virtually no differences in the performances of the average and learning disabled groups on tasks which require incidental learning, while there were significant discrepancies in performance on tasks requiring the active monitoring of progress and a cognitive organization of stimuli. Torgensen (1977) concluded that learning disabled children suffer from a "production deficit" wherein their basic psychological processes are intact, while their passive approach to learning impedes their ability to execute task appropriate strategies. While these studies contributed significantly to an expanding awareness of learning disabilities, further research was needed to explicate the roles of monitoring and cognitive strategy use in the acquisition of knowledge.

Subsequent studies by Dawson et al (1979) and Tarver et al (1977) found that with only a minimum of instruction on use of a strategy, learning disabled children performed as well as normal children on tasks requiring its efficient execution. Others, including Dawson, Hallahan, Reeve and Ball (1979), obtained comparable improvements when they instructed the children to use a specific strategy without actually instructing them in its use. Hallahan, Tower, Kauffman and Graybeal (1978) found that they could induce efficient strategy use simply by rewarding children with pennies for good performance, while in another study, Torgensen (1980) induced efficient strategy use in grade two children through verbally reinforcing good performance. The accumulation of an extensive number of studies in each of these areas confirms that learning disabled children frequently possess effective cognitive strategies in their repertoire, although they do not spontaneously use them. Furthermore, an interesting feature in many of the studies on induced strategy use in learning disabled children is that, while the subjects could successfully use the strategies when instructed to do so, or when extrinsically motivated, they did not continue to do so independently (see Borhowski and Cavanaugh, 1979). Further research is needed to determine why these children do not independently use cognitive strategies.

Since corrective strategy use is prompted by the recognition that understanding has not occured, it is plausible that learning disabled students may not spontaneously use cognitive strategies because they do not adequately monitor their performance. Hence, they do not recognize when it would be appropriate to take corrective action. This study utilized a reading task in order to determine the use of comprehension monitoring by learning disabled and normal students.

Purposes of the Study

The purpose of this study was to determine whether there were any differences in the comprehension monitoring of learning disabled and normal readers as they read instructional and frustration level materials. Several measures of comprehension monitoring were used as the children read one instructional level story and one frustration level story. They were asked to verbalize any dissonance at selected points as they read the stories. Then, the children were observed to see whether they spontaneously used a lookback strategy to resolve misunderstanding when answering questions. Finally, they were asked if they knew of a strategy to resolve misunderstanding, and were observed to determine how effectively they used the strategy on a cued task.

Definition of Terms

For the purpose of this study, the following definition of terms will be used.

Reading Comprehension

A two-way process wherein the reader uses graphic cues (bottom-up processing) in concert with his prior knowledge (top-down processing) in order to actively reconstruct meaning. Comprehension can be measured by the extent to which the reader's reconstruction of and elaboration upon the text are consistent with the author's intended meaning.

Comprehension Monitoring

Keeping a check on understanding as one reads. This involves recognizing when understanding has not occurred as well as when it has, knowing about corrective strategies, and finally, being capable of effectively appropriating specific strategies to rectify misunderstanding (Garner and Reis, 1981).

Lookback Strategy

Using rereading of previous text to correct misunderstanding. This could involve either the locating of specific facts, or locating clues to generate inferences.

Average Readers

Average grade four readers. These children were selected on the basis of a reading achievement score of grade 3.7 to 4.7 on the Gates MacGinitie Reading Test, as well as teacher ratings. Normal intelligence as measured by the Lorge-Thorndike Intelligence Test and fluency in English were also required.

Learning Disabled Readers

Grade six students who were reading at grade levels 3.7 to 4.7 as measured by the Gates MacGinitie Reading Test. The Edmonton Catholic School District identifies children as being learning disabled on the basis of their being a minimum of one third behind their reading achievement expectancy on the Bond and Tinker formula.

Hypotheses

The following hypotheses were formulated and investigated.

Hypothesis 1

There is no significant difference between average and learning disabled readers on monitoring as indicated by:

(a) recognition of miscomprehension

(b) knowledge of a lookback strategy

(c) effective use of a lookback strategy to rectify misunderstanding.

Hypothesis 2

There is no significant difference between performance on instructional and frustration level materials on monitoring as indicated by:

(a) recognition of miscomprehension

(b) knowledge of a lookback strategy

(c) effective use of a lookback strategy to rectify misunderstanding.

Hypothesis 3

There is no significant interaction effect between reading achievement and level of material on monitoring as indicated by:

(a) recognition of miscomprehension

(b) knowledge of a lookback strategy

(c) effective use of a lookback strategy to rectify misunderstanding.

Limitations and Delimitations

1. Since much monitoring is covert, it is difficult to assess to what extent a child is monitoring his comprehension.
2. The reading situation produced by the design of this study may have

been atypical for some students.

3. This study investigated only one strategy which could be used to correct misunderstanding.

Significance of the Study

The results of this study are significant to a better understanding of elementary school children's comprehension monitoring. Cognitive strategies, such as rereading, are commonly used in teaching learning disabled children although these students usually do not become spontaneously proficient in their use. One reason for their lack of independence in strategy use might be because learning disabled children do not recognize when they have not understood. This study contributes to the existing literature on average and learning disabled readers by providing an indication of how learning disabled readers compare to their normal peers in their ability to monitor comprehension and to effectively use a lookback strategy to rectify misunderstanding. This study will, therefore, have important implications for the teachers of both learning disabled and average elementary school children. Determining how learning disabled children differ in their comprehension monitoring has pedagogical implications which should be useful in developing remedial programs for these children for "while comprehension monitoring is no panacea for reading difficulties, it may offer new ways of thinking about and presenting comprehension techniques to students" (Pitts, 1983, p. 522).

Plan of the Investigation

Chapter 1 contains the introduction and statement of the problem, purpose of the study, definition of terms, and the hypotheses that guide the investigation. Limitations and delimitations, and the significance of the study were also discussed.

In Chapter 2, a review of related literature and research is presented. The design of the study is detailed in Chapter 3. Chapter 4 contains the findings of the study, and a discussion of the results. A summary of the study, the conclusions and implications, and suggestions for further research are presented in Chapter 5.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Introduction

In this chapter, a brief review of literature on discourse comprehension is included to provide a theoretical framework for the current interest in comprehension monitoring. The review of related literature will then focus upon comprehension monitoring research. While comprehension monitoring is a metacognitive skill, a hierarchical relationship was postulated by Baker and Brown (in Wagner, 1983) wherein "metacognition" and "cognitive monitoring" are synonymous terms which apply to knowledge about cognition in general. "Comprehension monitoring" by contrast is "viewed as applying mainly to reading comprehension, and is limited to comprehension of connected discourse" (p. 329). In keeping with this definition, this review will be restricted to investigations of monitoring which involve connected discourse, and will focus primarily on comprehension monitoring of written text. Since recent studies of comprehension monitoring began with an oral paradigm (Markman, 1977), many studies of oral communication are relevant to the study of monitoring of written text. In order to draw from this knowledge, some studies of oral communication have also been included.

Research on comprehension monitoring falls into two broad areas of investigation: (a) readers' metacognitions of person, task and strategy variables of the reading process, and (b) readers' functional monitoring of text as they read. Each of these broad areas contains investigations of developmental changes across ages as well as comparative studies of good and poor readers. Each of these areas will be included in the review of relevant literature.

Discourse Comprehension

Research in discourse comprehension has been heavily influenced by the fields of linguistics and cognitive psychology, the combination of which have come to be known as "psycholinguistics." Current theories of discourse comprehension have evolved from the proliferation of studies in the area of text structure (specifically studies in the area of macro-structure) which abounded in the mid to late 1970's, and theories of cognitive processes in reading which were concurrently expanded to include "the comprehension of story structure, integration of sentences, drawing inferences, testing hypotheses, relating background knowledge to textual information, and reading as a process of information search" (Guthrie, 1981, p. viii).

Schema theories were instrumental in the unification of linguistics and cognitive psychology. Studied by numerous theorists since the mid 1970's (see Rumelhart, 1981, for a review), this concept has not had a singular definition. Schemata, however, have consistently been viewed as the building blocks of cognition. They are seen as active processes which play an important role in interpreting and anticipating print, retrieving information from memory, organizing corrective action when misunderstanding occurs, and generally in guiding the flow of processing in the system (Rumelhart, 1981; Pearson, 1981; Trabasco, 1981; Bracewell, Fredericksen and Fredericksen, 1982; Cooper and Petrosky, 1976; Di Vista, Hayward, and Orlando, 1979; Pitts, 1983). In order to account for the comprehension process, it has been important to arrive at a clear definition of schemata. Depending upon their professional orientation, theorists have used a different focus when seeking such a definition. Hence, cognitive psychologists have tended to view schema with relatively more emphasis upon what goes on in the researchers' head, while linguists have focussed more upon the function of text in activating schema. Regardless of the specific orientation of the theorist, however, all modern theories of discourse comprehension see the reading process as involving some degree of reorganization. Readers are viewed as active agents who initially use text (bottom-up processing) to activate an appropriate schema with which to incorporate the semantic information. Then, subsequent interpretation of text is guided by the pre-existing schema (top-down processing). The relative influence of one type of processing over the other (top-down versus bottom-up) is guided by the reader's purposes at the time of reading (Bracewell et al, 1982; De Vista et al, 1979, p. 97), as well as by text difficulty and familiarity (Cooper and Petrosky, 1976; Rumelhart, 1981).

As they read, readers are constantly monitoring their understanding so as to detect any inadequacy of fit of text information into pre-existing schema. Accordingly, "the individual reader sets the criteria for judging whether comprehension is adequate or not and then decides which, if any, remedial action to take" (Pitts, 1983, p. 517). This skill of knowing when and how to take remedial action (comprehension monitoring) has come to be viewed as critical to comprehension. Comprehension monitoring has attracted much attention over the past few years and is also the focus of this study.

Comprehension Monitoring

Based upon constructivist theories of comprehension, the reader interacts with the printed page, allowing his/her prior knowledge to guide his/her expectations of the text. When a mismatch occurs between the actual text and the reader's expectations, a feeling of uneasiness or unfamiliarity occurs (Pitts, 1983; Markman, 1979). To resolve his/her confusion, the reader may have to reconsider the meaning of the text and make a decision about the adequacy of his/her comprehension. Comprehension monitoring involves both the subjective feeling that understanding has or has not occurred and the activation of appropriate corrective strategies in order to resolve misunderstanding. The general knowledge that guides the effective selection and implementation of task relevant skills to recognize and correct miscomprehension of text has been referred to as metacognition (Brown and Flavell, in Myers and Paris, 1978).

Some theorists have postulated that, since comprehension monitoring is a metacognitive skill, it can only be considered as a conscious activity (e.g. Wagoner, 1983). Others argue that readers (particularly young children) do not always have explicit knowledge of their own process and define comprehension monitoring in less restrictive terms. For instance, Pace (1979, p. 3) states that, "some evidence of planful self-monitoring or regulation is sufficient." Still others claim that whether comprehension monitoring occurs "at the conscious or subconscious level depends on characteristics of both the reader and the text." Accordingly, even good adult readers frequently are not conscious of their reading process as much of what they do has become automatic and below the level of consciousness. These strategies would thus be missed from verbal statements of what these readers do to monitor their comprehension (Pitt, 1983, p. 517). This difference in emphasis has led to two lines of research in comprehension monitoring.

Some researchers have focussed on what readers know about the task of reading (e.g. Garner, 1982; Pace, 1980; Meyers and Paris, 1978) while others have studied what readers actually do to monitor and regulate their comprehension during reading (e.g. Garner and Reis, 1981; Pace, 1982; Baker and Anderson, 1982). These two lines of research "reflect a difference in emphasis, not two independent entities" (Brown, in Winograd and Johnston, 1982, p. 62).

Metacognitions of the Reading Process

This section of the literature review will examine studies concerned with readers' metacognitions about the reading process. The development of such self-awareness and its relationship to the actual use of monitoring has become a topic of considerable interest in comprehension monitoring.

Theorists who view comprehension monitoring as deliberate, conscious action that "requires self-invoked plans and cognitive skills" (Meyers and Paris, 1978) see the acquisition of metacognitive knowledge about person, task, and strategy variables of the reading process as necessarily preceding and affecting the awareness of miscomprehension and the implementation of corrective strategies. In order to add to an understanding of comprehension monitoring these theorists have investigated what children and adults know about the reading process, and have attempted to identify developmental trends in the acquisition of metacognitive knowledge.

Person Variables

According to Flavell's (1979) description of variables which generally apply to metacognitive knowledge, this category of variable might include beliefs about any aspect of reader "intraindividual differences, interindividual differences, and universals of cognition" (Flavell, 1977, p. 907).

Paris and Myers (1978) and Gambrell and Heathington (1981) investigated readers' knowledge of the influence of motivation, goals and personal limitations to the reading process. Paris and Meyers used a structured interview to compare second and sixth graders' metacognitive knowledge about the abilities of a competent reader as well as their awareness of limiting conditions and how one might overcome them. Significantly more grade six than grade two students were aware that proficient reading requires specialized skills, the development of which they recognized to be related to both motivation and opportunity. In keeping with their superior knowledge of motivational factors, nearly all of the sixth graders perceived the goal of a story recall task as meaning construction, while the goal for nearly half of the second graders was exact reproduction of text.

Using a structured interview based upon that used by Paris and Meyers but modified for use with adults, Gambrell and Heathington (1981) compared good and disabled adult readers' metacognitions about person variables. On questions designed to assess the influence of personal motivation and interest to the reading task, significantly more disabled readers supported the role of personal motivation in learning to read. It should be noted, however, that the disabled readers in this sample were selected from a Right to Read Adult Academy Program. The differences in responses could be a reflection of this particular group's strong personal desire to learn to read, and not representative of a wider disabled population's awareness of the relationship of personal motivation to the reading task. The groups did not differ in their awareness of interest as a significant motivational factor in learning to read.

Although inconclusive, findings of these two studies suggest that awareness of one's personal involvement in the reading task develops with age regardless of reading ability. Grade two students were less aware than normal grade six and disabled adult readers of the significance of interest, motivation, and intrapersonal skills to the reading process.

Task Variables

Metacognitive knowledge in this category involves an understanding of what task variations imply for how the cognitive enterprise should be managed and how successful one is likely to be in achieving a goal (Flavell, 1979). Examples of task variables that can influence reading include the length of the passage, familiarity of the story content and text structure.

Myers and Paris (1978) investigated second and sixth graders' metacognitive knowledge of task variables. They found no significant differences between the groups in their awareness that the length and familiarity of reading materials influence the speed with which they can be read and remembered. However, grade two students fared less well than grade six students on measures of metacognitive knowledge of reading mode and structural factors. Only half of the grade two students as compared to 89 per cent of sixth graders thought that silent reading could be accomplished faster than oral reading, and significantly more sixth graders were aware of the special organization of paragraphs, including the semantic properties of the first and last sentences. When supplied with the task of either reading a story for exact reproduction or merely to report the gist of it, and asked which would be easier, however, grade two students were equally aware that exact recall of a story is more difficult although they were oblivious as to how the specific reading task should lead to the selection of differential strategies.

Hare and Smith (1982) used a retrospective paradigm to test good and poor grade six readers on their ability to rate the relative difficulty of two passages. Reading achievement scores were found not to be significantly related to the ability to identify the relative difficulty of passages. Furthermore, both groups spontaneously supplied "familiarity" as a variable which affects the readability of passages. Hence, poor grade six readers, like young subjects, were cognizant of the effects of familiarity on the reading task.

Gambrell and Heathington (1981) compared adult good and severely disabled readers' metacognitions about reading task variables. These adult poor readers, like Paris and Myers' grade two students, displayed poor metacognitive knowledge of reading mode, text structure, and the semantic properties of a reading task.

Awareness of potential problem causing situations and textual features would appear to be important if a reader is to set appropriate goals and comprehension standards for reading. Using a retrospective paradigm, Hare (1981) investigated college good and poor readers' metacognitions about problem causing situations when reading. Subjects read one low-knowledge and one high-knowledge article and subsequently relayed problems which they had encountered. Good and poor readers were equally cognizant that the task variable of structural features affected the comprehensibility of passages but poor readers differed from good readers in their recognition that "understanding a clause"

(p. 362) also affected text readability. This factor and the numbers of problems identified were significantly positively related to reading achievement. Hence, these findings support previous good/poor reader comparisons in that the poor readers experienced relatively more difficulty than good readers in recognition of the semantic properties of the reading process. This study, however, differed from previous investigations in that this sample of poor readers displayed better awareness of structural variables. Although their mean reading achievement level is not reported, since these poor readers were never-the-less college students, it is conceivable that the degree of reading retardation accounts for these differences in results, underlining the importance of clearly describing poor reader subjects.

Taken in concert, these studies suggest that younger and poorer readers are generally aware of the influence of some task variables (i.e. familiarity) but not others (i.e. structural features and semantic properties) upon the reading process.

Strategy Variables

This category involves "knowledge that could be acquired concerning what strategies are likely to be effective in achieving goals" (Flavell, 1979, p. 907). Knowledge of various strategies is important since "comprehension monitoring should be flexible and adaptive so that one can generate alternative plans and employ appropriate numbers and kinds of plans to solve the task"(Paris and Myers, 1981, p. 7).

Myers and Paris (1978), investigated second and sixth grade children's metacognitions about strategy variables in reading. They identified and investigated several variables which lead to the employment of different strategies including: (a) the establishment of specific goals for reading, (b) the criteria used for determining if comprehension was adequate, and (c) awareness of alternate methods for determining unknown information or reaching reading goals. Differences between the groups were significant in all areas. Grade two children were not sensitive to the need to invoke special strategies for different materials and goals. They reported few strategies or reasons for checking their own progress, and had few resources available for deciphering the meaning of unknown words or sentences. Those resources available to them tended to be external sources, such as other people, while the grade six students generated more internally oriented strategies. Myers and Paris concluded that grade six children were better aware of the existence of various reading strategies and were sensitive to when and how to use them.

Based upon their (1978) study, Paris and Myers (1981) theorized that a crucial difference between good and poor readers might be their ability to select and use appropriate strategies for improving comprehension. They generated 20 reading strategies according to four categories. The grouping consisted of 10 positive strategies that could facilitate comprehension, and 10 negative strategies that could be detrimental. The positive and negative groups were further subdivided into internal strategies (e.g. positive: "Ask yourself questions about the ideas in the story."; negative: "Think about something else while reading.") and into external strategies requiring additional materials or other people (e.g. positive: "Look up words you don't know in the dictionary."; negative: "Watch TV while you read."). Grade four good and poor readers were asked to rate the strategies on a nine point scale ranging from "helps a lot," to "hurts a lot." The amount and organization of story recalls was significantly negatively correlated with several items which poor readers rated highly. For instance, one internal negative strategy, "saying every word over and over", was rated as very helpful by poor readers and as neutral by good readers. Paris and Myers concluded that poor readers were less aware of the detrimental influences on comprehension of negative factors than good readers while their awareness of positive and neutral factors was equal.

Self-report methodologies, retrospection and protocol analysis were employed by Hare and Smith (1982) in two studies which were designed to investigate good and poor sixth and seventh grade readers' metacognitions about strategies for enhancing reading comprehension. Following spontaneous retrospections on self-reports about strategies used in reading one narrative and one expository passage, students were cued on five commonly reported problem-solving strategies (rereading, selective reading, imaging, adjusting speeds, and relating the passage to personal experience) and asked if they had used any of these strategies when reading either passage. The numbers of strategies spontaneously produced by readers was significantly positively correlated to reading achievement and was more pronounced for the expository (difficult) passage. Numbers of cued strategies recognized by readers was not significantly related to reading achievement. A breakdown of types of strategies produced and recognized by all subjects as a function of passage type offered evidence of differential strategy use according to the type of reading materials. Rereading was the most frequently mentioned and recognized strategy. Next in frequency for the narrative passage was imaging, and next in frequency for the expository passage was changing speeds. Hare and Smith concluded that students had no trouble reporting the strategies they thought they employed in reading to remember, and that good readers actually do use more of these strategies.

Garner (1982) used a self-report methodology to investigate adult expert readers' metacognitions about strategy use. An expository passage about an unfamiliar topic was used since this type of passage "probably induces more conscious, analytic processing than a narrative or an expository piece about a highly familiar topic" (p. 162). Subjects were told to read for the purpose of summarizing the passage and subsequently retrospected about the strategies which they had used. While a wide range of strategies was reported, rereading was the most frequently reported.

Using a retrospection task, Hare (1981) compared adult good and poor readers' metacognitions about their problem identification and problem solving strategies when reading one low-knowledge and one high-knowledge article. The total numbers of strategies mentioned dropped for all readers from the high to the low-knowledge article. Good readers reported using twice as many strategies as poor readers in the high-knowledge article, and over three times as many in the low-knowledge article. Hare concluded that poor adult readers demonstrated more rigid, limited strategy profiles, and that even the good readers responded less flexibly to difficult reading situations. Rereading was the most frequently mentioned strategy for good and poor readers alike on both passages. Good readers, however, appeared to benefit more from rereading, as this strategy was significantly positively related to reading achievement for high- and low-knowledge passages.

Two additional strategies (reading selectively, and adjusting speed) also differentiated between good and poor readers on both articles. She concluded that metacognition about reading problems and strategies, the quantity of comprehension monitoring comments, and the number and kinds of reading strategies reported were all associated with reading achievement.

Gambrell and Heathington (1981), adapted a structured interview paradigm developed by Myers and Paris (1978) to assess adult good and disabled readers' metacognitions about reading strategies. Adult poor readers reported fewer strategies, displayed more misconceptions about strategies, and were not as sensitive to how and when to use specific reading strategies to resolve comprehension failures. Gambrell and Heathington concluded that the adult poor readers in this study were alarmingly like the grade two readers in the Paris and Myers study.

In sum, investigations into readers' metacognitions about strategies for monitoring progress and resolving comprehension failures have found poor readers' strategy profiles to resemble those of primary aged students. Both primary students and poor readers are rigid in their use of strategies and appear insensitive to the need to invoke differential strategies to meet changing reading goals. They report using few strategies, and those strategies reported tend to be external (such as asking for assistance), rather than internally generated. One useful, internal strategy, however, does appear to be acquired developmentally early. Regardless of age or reading level, rereading was the most commonly recognized and reported strategy.

By the time they reach upper elementary age, good readers have amassed a large repertoire of strategies which they use flexibly depending upon task demands. When presented with difficult materials, however, even good readers display relatively limited and rigid strategy profiles. Hence, once acquired, efficient strategies may be manifested in some circumstances but not in others.

Summary and Conclusions

Taken in concert, these investigations into readers' metacognitions of person, task, and strategy variables indicate that readers' developing awareness of the reading process is not a unitary phenomenon, but rather encompasses several areas of knowledge and degrees of awareness. The various aspects of knowledge may appear at different ages, and they also interact with task demands and reading situations so that what is known and easily articulated in a familiar context may be inaccessible under different circumstances.

While the results of these studies have helped to identify strategies used by readers for monitoring comprehension, and have identified important relationships between reader age and proficiency, there are problems with self-report methodologies which preclude heavy reliance upon their results. The consistency of results of the majority of these studies, however, does provide accumulating evidence that differences in comprehension monitoring between younger/poorer readers and older/better readers do exist. A unique contribution of these studies is that by identifying specific strategies used by readers, they have disclosed important avenues for further research. Rereading was the most commonly reported strategy for both good and poor readers, and was the focus of the present study.

Metacognitive and Functional Knowledge Contrasted

Since there exists the possibility that young and poor readers may only be less articulate than good readers in expressing how they do in fact read, it was deemed important to corroborate readers' verbalized knowledge about their own reading processes with visible evidence of what they do. Gambrell and Heathington (1981) suggested two avenues of research to help determine the validity of self-report methodologies. They called for additional metacognitive research to first of all identify discrepancies between how readers think they read and how they actually process print, and secondly, to determine the extent to which verbalization is an accurate reflection of level of awareness about the reading process (p. 221). Studies reviewed in this section were addressed to these issues.

Baker (1979) tested college students' awareness of their reading processes. After subjects read passages containing various forms of induced inconsistencies, retrospective reports and protocols were obtained to assist in discovering how the confusions were comprehended. Observers were also utilized in order to compare what the students actually did to what they believed they did. Consistent with the results of previous error detection studies, even after being explicitly instructed to look for confusions, and cued as to the type of inconsistencies to look for, adult college students detected only 38 percent of the confusions. Inspection of the recall protocols, retrospective reports, and observer notes yielded some insights into subjects' poor performance. A major obstacle to error detection was found to be the automaticity of corrective strategies. Subjects used corrective strategies to resolve potential confusions so automatically that they were unconscious of having done so, and unaware that there had been a confusion. A further confounding factor was that the purposes for reading set by the subjects influenced their selection of strategies in ways which were not always compatible with the task demands of confusion detection. For instance, because some subjects were reading for the main idea, they did not use comprehension strategies which would lead to the detection of detail confusions. Baker found that college students have at their disposal a variety of strategies to assist them in coming up with a plausible interpretation of confused text. Moreover, since these procedures are sometimes applied so automatically that readers are unaware that there was a confusion, she concluded that the failure to report a confusion is not a sensitive index of comprehension monitoring.

Pace (1980) theorized that second graders would be better able to benefit from a relistening strategy to correct comprehension errors than would kindergarteners. She further hypothesized that no differences in ability to use the strategy would occur between those who displayed metacognitive knowledge by suggesting a relistening strategy and those who did not. After twice hearing a story and answering questions about it, subjects were asked whether they knew of a way, other than asking the examiners, that they could find answers to questions they did not know or could not remember. One third of the kindergarteners and all but one second grader spontaneously suggested using a relistening strategy to find the answers to questions they did not know, but all were equally able to benefit from listening again to a story in order to correct their answers to integration and referent questions. Pace concluded that awareness of an appropriate corrective strategy provided no advantage to these children, nor, apparently was it necessary.

Brown and Smiley (1977) compared the metacognitive abilities of students of various ages in order to detect developmental trends, as well as to determine the influence of metacognitive awareness of the linguistic units of prose passages to the quantity and organization of recalls. Students in the third, fifth and seventh grades as well as college freshmen rated the linguistic units of prose passages in terms of their importance to the structure and theme of the passages. Brown and Smiley found a strong developmental trend with gradual improvement in the sensitivity to detect the degree of importance of structural units emerging over the entire age range sampled. Subjects were subsequently asked to recall the stories. Third graders recalled significantly less important material than all the other subjects, but the remaining groups did not significantly differ from each other. Furthermore, for all subjects, including third graders, recalls were strongly affected by the structural importance of the story units. While older subjects recalled more units than younger ones, the general pattern of results was consistent across the age range, with the least important units being recalled less frequently than all other units, and the most important units being the most frequently recalled. Hence, while young children do have difficulty consciously determining the key points of a passage, there is evidence that when recounting the stories, even young children favor the more important facts and disregard nonessential details.

As a group, these studies provide limited evidence that readers of all ages possess a tacit knowledge of their reading processes. While concurring that comprehension monitoring is guided by general knowledge (metacognition) that guides the effective and often deliberate co-ordination of many task relevant skills, the theorists suggest that much monitoring is below the level of consciousness and cannot be adequately assessed by self-report methodologies alone. This study utilized an observable strategy use paradigm to study children's functional knowledge of a lookback strategy. A measure of their verbal knowledge of the strategy was also included.

Functional Knowledge of Comprehension Monitoring

A reader who is monitoring his own comprehension has a "better basis for selecting the reading strategy best suited to the needs of the moment" (Winograd and Johnston, 1982, p. 62). Some researchers interested in comprehension monitoring have dealt directly with how readers regulate and monitor their comprehension during reading. Rather than concerning themselves with what readers know about their comprehension monitoring, these theorists have looked at the conditions under which readers monitor their reading and, the specific strategies which they use to correct misunderstanding. Included in this section are investigations of readers' functional comprehension monitoring abilities.

Error Detection Paradigm

The most commonly used instrument in investigations of readers' awareness of miscomprehension has been the error detection paradigm. Such tasks usually involve reading (or listening) to a passage in which an error has been embedded. If the subject does not spontaneously mention the error following the reading, probe questions are usually asked in an attempt to induce him/her to mention the inconsistency and/or to learn why he/she did not mention it earlier. Error types have included incomplete instructions (Markman, 1977, 1979), inappropriate transition words linking sentences, unclear pronominal references (Baker, 1979), and contradictory information (Baker, 1979; Markman, 1979; Garner, 1981, 1982; Winograd and Johnston, 1982).

The error detection paradigm has its roots in studies of oral communication discourse. Researchers in this area investigated the developmental process wherein young children learn to identify "communication failure as due to a fault in the message rather than to a fault in the self-as-message-receiver" (Wagoner, 1983, p. 331). In a preliminary investigation of comprehension monitoring, Markman (1977) extended the oral discourse paradigm and related it to new theories of comprehension wherein the reader is viewed as an active agent who reconstructs meaning. She theorized that a person who passively listens to instructions without mentally performing each successive step would not encounter problems which might otherwise lead to the recognition of failure to comprehend. Markman presented a listening task to children in grades one to three in order to assess at what point primary children became aware that directions were inadequate to perform a designated task. Highly inadequate instructions for playing a game and for performing a magic trick were presented, followed by a series of probes which ended when the child asked an appropriate question, thereby demonstrating awareness of the inadequacy of the communication. In a second study, Markman both demonstrated and verbalized the same task thereby reducing the amount of constructive processing required by the children before they could detect the inadequacy of the instructions. The children performed better in the second study, supporting the theory that lack of constructive processing is responsible for misleading the children into believing that they had understood. A developmental trend was also noted wherein, in both studies, grade one children were unable to perceive the inadequacy of the directions until they actually attempted to perform the task themselves, and second and third graders, especially in the reduced processing condition, were better able to recognize the need for more information before attempting the task. Markman concluded that younger children may process information more superficially than do older children.

In an extension of Markman's paradigm, Kotsonis and Patterson (1980) compared normal and learning disabled boys' comprehension monitoring skills. They presented a Candyland-like game learning task, one rule at a time, to young (7-8 year olds) and older (9-10 year olds) normal and learning disabled boys. After each rule was presented the child was asked if he knew how to play the game and, once he said he knew how to play, he was interviewed regarding his knowledge. Normal boys requested significantly more rule information and asked more extra questions than did learning disabled boys. No significant age differences were found. The results were interpreted to show that learning disabled children are deficient in their ability to monitor their comprehension. Normal and learning disabled subjects were comparable in measures of attention, impulsivity and recall, ruling out the confounding influence of these variables upon the results.

In the first of a short series of studies investigating children's awareness of problems in text, Markman (1979) read essays containing either explicit or implicit informational inconsistencies to third, fifth and sixth grade students. The children were encouraged to ask questions and were subsequently presented with a series of probes which were designed to elicit a question indicating problem awareness. No grade differences were found. Although passage recall was good, children appeared unaware of implicit inconsistencies and few children noticed the explicit inconsistencies. Examination of the recalls revealed that the children had excellent recall of the information needed to generate the inconsistencies. They had the logical capacity to draw the required inferences, and they were not generally embarassed to ask questions or reluctant to criticize the essays. Markman concluded that when inferences were required to discover the inconsistent material, elementary school children were unaware of the problems.

Hypothesizing that the children in study 1 could have missed the explicit problems because they failed to connect the critical sentences, Markman devised a second study in which contiguity of the incompatible sentences was established for some subjects by having them repeat the sentences together, while a control group was asked to repeat the entire essay. Third and sixth grade students were compared. Although inconsistent sentences were paired, repetition elicited no improvement in third grade students' performance in either implicit or explicit conditions. Sixth grade students also made no improvements in the implicit condition; however, most of them spotted the explicit contradictions even without repetition. Markman concluded that "once the sentences are related in memory, sixth graders, unlike third graders, may spontaneously initiate the appropriate comparisons" (p. 651).

In a third listening study, Markman gave third and sixth grade children the same implicitly and explicitly contradictory essays. Half of the children were warned explicitly to look for the problem in the essays. While in the standard condition the performances of third and sixth graders did not differ, sixth graders who were informed of the existence of a problem significantly outperformed third graders who also expected a problem. Furthermore, when sixth graders were informed of the existence of a problem, differences between explicit and implicit material disappeared. Third graders who expected to find a problem questioned the truth (external validity) of statements, whether problematic or not. Markman concluded that "the nature of the standard that they choose to monitor their comprehension affects children's awareness of a problem" (p. 653). She expressed a need for more research in this area.

Taken together, these listening studies suggest that "Monitoring for consistency is not a single unified act. It is composed of a variety of subprocesses which need to be appropriately organized" (Markman, 1979, p. 653). While there is evidence of a developmental trend with older children being more cognizant of obstructions to their comprehension, their advantage is tenuous and can easily be enhanced or reduced by variations of task demands. There is also limited evidence suggesting that learning disabled children are less capable than normal children of monitoring their comprehension.

Pace (1979) investigated kindergarten, second, fourth and sixth grade children's sensitivity to story information that conflicted with their pre-existing schema. The effect of oral versus written presentation was also assessed. Grade two readers noticed approximately equivalent proportions of items inconsistent with usual expectations as did fourth and sixth grade readers, while second grade children who listened to the same stories were much less aware of the inconsistent information than were fourth and sixth grade listeners. The second grade children's performance on the listening task, in fact, was comparable to that of the kindergarteners. Pace concluded that "children's awareness of unusual information may be influenced by whether they read or listen to the story in which it is embedded and that this difference may be sensitive to developmental factors" (p. 7).

Paris and Myers (1981) compared the comprehension monitoring of fourth grade good and poor readers in situations of spontaneous and directed monitoring during oral reading. The investigation was designed to reveal any "production deficiencies" wherein poor readers might have the ability to notice and correct comprehension failures when required to do so, although they may not do so spontaneously. Nonsense words and non-meaningful phrases were scattered throughout the stories. Good and poor readers in the spontaneous monitoring task detected only 42 percent and 32 percent of the nonsense words and phrases respectively. In the directed underlining condition both good and poor readers failed to detect the majority of nonsense words while they recognized 70 percent and 35 percent anomalous phrases respectively. Paris and Myers concluded that "comprehension monitoring, especially when directed, is less accurate in poor readers than in good readers" (p. 13). The interpretation of these results, however, is suspect since the readability level of the passages was considerably above the reading capabilities of the poor readers. In fact, Paris and Myers reported that the comparatively poor performance of the poor readers was not due to "a lower absolute frequency of underlining" (p. 11), but to the underlining of many legitimate words and phrases by poor readers. This finding may be suggestive that poor readers did possess equal intents to monitor their comprehension, and that the "legitimate words" were truly problematic for them.

An error detection paradigm was utilized by Winograd and Johnston (1982) to examine the conditions which were likely to facilitate error detection by good and poor sixth grade readers. They found that while neither group did outstandingly well, good readers performed better than poor readers, and that both groups improved with practice. Providing schema preparation before reading did not improve performance for either group. Winograd and Johnston concluded that the error detection paradigm does not provide an adequate measure of problem detection in reading, and identified a large number of possible causes for readers' poor performances. Lack of control over the readers' purposes for reading or criteria for adequate comprehension, over use of probes, and over reliance on self-reports were amongst their major criticisms. Winograd and Johnston recommended the use of multiple measures of comprehension monitoring in future studies.

In a series of studies, Garner utilized an error detection paradigm with task and presentation adaptations. In a preliminary test of the "piecemeal processing" explanation, Garner (1981) hypothesized that "poor comprehenders attend to within-sentence comprehensibility far more than across-sentence comprehensibility" (p. 159). Fifth and sixth grade good and poor readers silently read (a) an informationally consistent passage, (b) an informationally inconsistent passage on a different topic, and (c) a modified word passage on a third topic, and subsequently rated the comprehensibility of each passage. Poor comprehenders indeed, displayed a significantly greater concern with long words within sentences than with inconsistent information across sentences, suggesting that they "attend a great deal to the decoding of individual words, and do not note major informational assaults on comprehensibility of ideas" (p. 162).

Influenced by Winograd and Johnston's criticism of the error detection paradigm, Garner (1982) conducted a modified replication of her previous study in order to generate data which could be examined for methodological dilemmas and to test the effect of explicitness of directives to subjects. Participants were selected in the same manner as the subjects of the previous study but a new passage was generated to minimize the possibility of inferential fix-ups. The directives factor was of central interest in this study. A direct instruction to some subjects to locate passage errors was the major treatment modification and was expected to increase error detection performance. A second group expected to do poorly was given no instruction which would suggest the possibility of finding errors; and a third group was asked to read the passage and decide if it made sense. This final set of instructions was practically identical to those given all subjects in the earlier study, and was expected to produce essentially the same results. Support for these hypotheses was not found as the results produced no statistically significant differences between groups. Garner concluded that further research was necessary to determine "whether no differences were found among treatments because the explicit directive facilitating effect found among adult readers does not hold for younger readers or because the method employed did not adequately bring very real differences to the surface" (p. 73). Since in this replication study similar subjects, treated with the same instructions but who read a different (although similar) passage than that used in the first study, outperformed the previous subjects by nearly 50 percent, she also underlined the importance of including experimental materials in future reports of investigations.

Garner (1980) studied good and poor junior high school reader differences in comprehension monitoring skills. Seventh and eighth graders were directed to process two expository passages as editors. Each passage had been divided into four segments, and in two of the four segments of one passage, material had been altered to introduce inconsistency with the overall message. After each segment, monitoring was assessed and subjects were asked to rate the comprehensibility of the segment. Garner found that "Good readers rated nearly all consistent-information segments of the passages as very easy to understand, but did not rate inconsistent-information segments in the same manner. Poor readers, on the other hand, made little rating distinction across the segments containing material intended to be either consistent or inconsistent with passage gist" (p. 61). She concluded that good readers noticed the disruptive effect of the altered passages and poor readers did not.

Baker (1979) looked at college student's ability to detect several kinds of inconsistencies when reading expository material: informational confusions in either main ideas or in details, unclear referents, and inappropriate logical connectives. She found that confusions were recognized more readily in main points than in details, that both inconsistent information and unclear referents were noted more often than were inappropriate connectives, and that problem identification could be induced. She concluded that automatic and unconscious use of fix-up strategies as well as the subjects' criteria for adequacy of comprehension interfered with error detection.

Baker and Anderson (1982) designed a study to assess ongoing comprehension monitoring among mature readers. College students were asked to read several expository passages, some of which contained deliberately introduced inconsistencies. Passages were presented one sentence at a time on computer terminals which allowed subjects the options of: going on to the next sentence, rereading the previous sentence, or going back to the start of the segment. The numbers and locations of rereadings as well as the amount of time spent on each sentence were recorded by the computer to provide a direct on-the-line measure of comprehension monitoring. Additionally, in order to test the effect of the expectation of miscomprehension on monitoring, half of the subjects were told at the outset of the experiment that inconsistencies would be present and half were not told. Instructing subjects to be on the alert for inconsistencies did not affect performance. Furthermore, one third of inconsistencies were missed, and 49 percent of the subjects failed to report either one or both of the inconsistencies. No significant differences were found between main point and detail inconsistencies. Further analysis of individual data records was carried out to determine the degree of intra-individual consistency of comprehension monitoring. Little individual consistency was found. Baker and Anderson concluded that the finding that instructing subjects to evaluate the text for consistency had no effect is indicative that all of the subjects in their study applied this standard routinely. The implication drawn from the lack of intra-individual consistency was that "attempting to specify characteristics of the successful comprehension monitor may not be a fruitful approach;

there is no single most effective processing style. Readers have a wide repertoire of monitoring activities available to them, and these can be used with flexibility and effectiveness" (p. 292). They suggested that an appropriate area for future research would be the establishment of reasons for good adult readers' lack of error detection.

In sum, error detection studies have identified various manipulations which can be employed to increase readers' sensitivity to text inconsistencies. Developmental trends and good/poor reader differences have also been identified. Unfortunately, though, readers of all ages and reading abilities have performed poorly on their respective error detection tasks, and theorists have found it difficult to establish any consistency in findings. In this study, therefore, a school-like reading task was selected to investigate children's recognition of the need to monitor their comprehension. Since the nature of the passages used in investigations have been found to differentially influence the results, the comprehension monitoring abilities of average and learning disabled readers, in the present study, were investigated at two reading levels.

Corrective Strategy Use

In effective comprehension monitoring, "the utilization of 'fix-up' strategies necessarily takes place following the readers' realization that a comprehension problem exists" (Wagoner, 1983, p. 340). For any reader, comprehension problems can be experienced either in terms of his/her assessment of the internal consistency of the text itself, or in his/her evaluation of its consistency with his/her prior knowledge. The following studies will focus on readers' use of corrective strategies to solve comprehension difficulties.

Di Vesta, Hayward, and Orlando (1979) investigated the use of fix-up strategies in sixth, seventh, and eighth grade, and high school good and poor readers. They utilized a cloze task which was structured to require two different contextual strategies. One set of paragraphs omitted five key words near the beginning of each paragraph, while another set omitted similar words near the end of each paragraph. Reading the entire paragraph was necessary for full comprehension. Strategies elicited were defined as the use of previous text (running text) and the use of subsequent text, with the use of subsequent text seen as the more mature strategy. Poor readers at all levels had difficulty in using subsequent text to clarify their understanding. A developmental trend was also noted wherein young readers experienced difficulty using subsequent text,but by the seventh or eighth grade differences in the use of the two strategies were negligible. De Vista, Hayward and Orlando interpreted the results to imply that poor readers "have limited knowledge of the role they, as processors of information, play in comprehending text" (p. 105). They viewed poor (and young) readers as being unaware that they can accommodate to the text they are reading by sampling portions as dictated by their needs, rather than passively relying on the order in which the words are presented.

Pace (1980) investigated kindergarteners and second graders ability to use a relistening strategy to correct comprehension errors. The ability to correct three kinds of errors in comprehension was observed through questions which: (1) assessed information contained within a single sentence, (2) required the correct identification of the referent of a word, or (3) were dependent upon the interpretation of information across sentences. While all of the children did poorly in answering the questions, questions requiring identification of a referent were easiest, those demanding intrasentential integration were next in difficulty, and hardest were questions requiring integration of intersentential information. Considering the low mean scores of all subjects in this study however, any conclusions drawn must be tentative.

Pace (1981) investigated monitoring strategies used by second, fourth, and sixth grade students while reading familiar and unfamiliar content. Overt monitoring behavior such as rereading or referrals to the questions to assess comprehension were recorded and analyzed. Developmental trends were found, with more sixth graders consulting the questions while reading or looking back at the story content when answering the questions. No differences were found between the monitoring behavior of second and fourth graders. Furthermore, the unfamiliar story prompted more monitoring than did the familiar story. Pace found the results to be suggestive that, "once available to children, comprehension strategies can be used flexibly and when judged appropriate" (p. 9). When reading the familiar content story, Pace concluded that children were able to use their prior knowledge to judge the accuracy of their responses to the questions and hence, the use of rereading could be judged to be unnecessary.

Garner and Reis (1981) also investigated the use of a lookback strategy to resolve miscomprehension. They developed a segmented story task in which the reader would be unable to answer certain questions without looking back at previous segments of the story. The subjects were good and poor readers ranging from grade four through grade ten levels. Spontaneous lookbacks to answer the lookback questions were recorded. Other observable behaviors such as hesitations and facial distortions were considered to reflect an awareness of miscomprehension, and were also recorded. Findings indicated that good readers in grades six, seven, and eight all demonstrated monitoring behavior but that only the oldest subjects (grade eight students) used the lookback strategy successfully, even though all had been instructed to re-read as necessary. Older poor readers did not differ from younger poor readers; all failed to show any awareness of miscomprehension and all failed to use a lookback strategy. One interesting finding from this study is that demonstration of an awareness of comprehension difficulties (through observed non-verbal monitoring) did not ensure the use of a corrective lookback strategy. Grade six and seven good readers demonstrated monitoring, but most failed to use lookbacks to resolve their comprehension difficulties. Garner and Reis concluded that "we have at least preliminary evidence, then, that movement from novice to expert in the area of detecting and resolving comprehension obstacles involves steps where monitoring may precede the ability to use fix-up strategies" (p. 579). However, since the lookback questions in this study entailed the integration of information across sentences and story segments, it is possible that the task was too difficult for young and poor readers. Further research is indicated in this area and is the focus of the present study.

Wannacott and Raphael (1983) used a lookback paradigm to investigate third and sixth grade good and poor readers' strategy use, and the relationship of these strategies to answer quality. Subjects read two passages and answered 12 questions about each. Question types included in the study were: (a) textually explicit, (b) textually implicit, and (c) scriptally implicit. Performance and observation data were used to determine the effects of grade, reading ability, and question type on effective strategy use and answer quality. The quality of student responses was found to be positively related to grade, reading achievement, and question type, while lookback accuracy (whether or not subjects were successful in locating the target page) was found to be a significant predictor of answer correctness for text explicit, but not text implicit questions.

In sum, investigations of readers' corrective strategy use have indicated that movement from novice to expert user of comprehension monitoring strategies occurs in stages. The realization that a comprehension problem exists must precede the activation of corrective strategies, but there is accumulating evidence that recognition, even when it is accompanied by verbal knowledge of an appropriate corrective strategy, does not ensure the use of the strategy. Developmental trends and good/poor reader differences have also been noted. Further research in good/poor readers' use of corrective strategies is needed and is the focus of this study.

Summary and Conclusions

Studies reviewed in this section have been concerned with the conditions under which readers monitor their comprehension, and the specific strategies which they use to correct miscomprehension. Investigations of readers' functional comprehension monitoring abilities have yielded considerable evidence that readers' identification of inconsistencies and use of corrective strategies progress in a number of developmental, age related stages. There is further evidence that development of strategy use is not unidirectional, but is influenced by numerous textual and situational factors, many of which have been identified through the use of error detection paradigms. Much support has also been obtained for theories of comprehension monitoring which positively relate reading achievement to comprehension monitoring abilities.

Chapter Summary

Investigations in the area of discourse comprehension since the mid 1970's have led to a growing interest in comprehension monitoring. As the focus in comprehension has shifted from what readers understand to how they comprehend, theorists have become increasingly concerned with readers' (or listeners') recognition that they have not understood and the methods which they employ to correct misunderstanding.

Much comprehension monitoring research has focussed on readers' metacognitions about the reading process. The major contribution of these studies has been the identification of important areas for further study. Rereading has frequently been reported to be the most used corrective strategy, yet little research has been done regarding its actual use by readers. This study adds to the available body of research on readers' use of a lookback (rereading) strategy when reading instructional and frustration level passages.

Differences in good and poor readers' ability to detect comprehension failures in a variety of texts and to effectively apply corrective strategies have also been investigated. However the findings are contradictory and since many of the studies have been problematic, the question of whether or not there are differences remains unresolved. This study adds to the existing research about average and learning disabled readers' comprehension monitoring skills.

There is preliminary evidence that recognition of miscomprehension and verbal knowledge of an appropriate corrective strategy are not always sufficient to ensure the use of a corrective strategy. This study adds to the accumulating research in this area of investigation.

There is some evidence that passage difficulty influences readers' use of corrective strategies as well as their ability to benefit from the strategies once they are executed. This study also adds to this body of research. The design of the study is presented in the next chapter.

CHAPTER 3

DESIGN OF THE STUDY

Included in this chapter is a description of the experimental design, the selection of the sample, the instruments and procedures used in gathering data, the coding of the data, the pilot study, and the statistical analysis.

The Experimental Design

A two-by-two factorial design was used in the study. Since the purpose of this study was to examine the relationship of comprehension monitoring to reading achievement and the level of difficulty of materials, the two factors (independent variables) were reading achievement and level of difficulty of the materials. The dependent variable was comprehension monitoring. Several measures of comprehension monitoring were designed to assess the degree of monitoring performance of normal and learning disabled readers as they read instructional and frustration level materials. Specifically, tasks were selected to measure each child's recognition of misunderstanding, his knowledge about the use of rereading to correct miscomprehension, and his actual use of lookback as a strategy to monitor his comprehension. The following figure presents a schematic representation of the experimental design.

	Instructional Level	Frustration Level
Average grade four students		
Learning disabled grade six students		

Figure 1. The Experimental Design

Sample Selection

The sample for this study consisted of 20 normal grade four readers and 20 learning disabled grade six students drawn from six schools within the Edmonton Catholic School District. Each of the schools was located in North-East Edmonton and the subjects are representative of average grade four and learning disabled grade six students in this area.

The guidelines used by the Edmonton Catholic School District in the identification of learning disabled students were adopted for this study. Accordingly, students were selected on the basis of having average intelligence and being a minimum of one-third behind their reading achievement expectancy. The Bond and Tinker formula was used to determine reading expectancy:

$$\frac{(\text{No. of years in school} \times \text{I.Q.})}{100} + 1.0 = \text{R.E.}$$

Hence, grade six students, with a minimum I.Q. of 80 and who were reading below a grade five level, were considered learning disabled. Reading achievement and intelligence scores were obtained from each school's cumulative records.

In order to determine differences in the comprehension monitoring of normal and learning disabled readers, average grade four students were selected to form the control group. While these subjects were an average of 2.1 years younger than the learning disabled group, they were reading at the same level. The mean chronological ages for the average and learning disabled groups respectively were 9-8 and 11-9.

Several factors contributed to the selection of a control group which had a two year age discrepancy from the experimental group. Firstly, it was felt that the most reliable data for a comparative study of comprehension monitoring could be obtained by comparing two groups of students whose level of proficiency in reading was similar. As discussed earlier, many previous studies of comprehension monitoring (e.g. Paris and Meyers, 1981) drew questionable conclusions because the instruments used in the data collection were at instructional level for the good readers but at frustration level for the poor readers. Since the level of difficulty of the passages may be a factor in the use of comprehension monitoring, it was important that the level of difficulty was the same for both groups. Using chronologically matched groups but administering two similar instruments, each with an adjusted level of difficulty, was also seen as problematic (see Winograd and Johnston, 1982 for a review of problems in recent studies). Hence, using a single instrument and testing two groups who were reading at the same level, was considered advantageous in that it would mitigate against the possibility that subtle differences in measurement could result from seemingly comparable instruments.

A second problem in using chronologically matched groups is that it would be difficult to avoid comparing novice readers to more proficient good readers. In that monitoring is a learned skill, it is conceivable that learning and generalization of the skill proceeds in a hierarchy of steps which become more clearly defined as the child uses his new knowledge in a variety of contexts. For instance, "children might at first distinguish only between understanding and not understanding things ....to a clear representation of something, or to a definite sense of what they should do next" (Flavell, 1979, p. 909). Since poor readers would have had to concentrate more on the basics of reading, they would not have had the same opportunity to use and develop their comprehension monitoring skills as would better readers of the same age and thus would not have had an equal opportunity to refine their monitoring skills.

A third argument in favor of using a control group comprised of younger children is that researchers have found that the failure to spontaneously use corrective strategies, which is so prevalent in learning disabled children, is common in younger normal children. Researchers(e.g. Tarver et al, 1976, 1977) have shown that while learning disabled children eventually develop the same task strategies as normal children, their attainment of these lags behind their peers by about two years. Hence, by using a control group consisting of children who were two years younger than the learning disabled group in this study, the two groups could be expected to have attained a similar level of competence. In this way, real differences, if any, in the fashion in which students from each group approach the monitoring process might more easily manifest themselves.

In order to minimize the confounding effects due to age differences, students at the grades four and six levels were chosen for the study. According to Piaget's stages of intellectual development, these students would all be at the concrete stage of intellectual development. The concrete stage of development extends from ages seven to 11 (Inhelder and Piaget, 1958). Furthermore, since the focus in reading instruction at the grade four level is on comprehension rather than word identification, the younger group would have had the benefit of at least one full year of instruction in comprehension. Consequently, they should recognize the need to monitor their comprehension of what they read.

In order to select grade four and learning disabled students who were comparable in intelligence and reading achievement, test scores on the Gates Mac-Ginitie Reading Test and the Canadian Lorge-Thorndike Intelligence Test were obtained from the schools' cumulative records. Several other variables, as indicated below, were also considered in the selection of the sample.

1. Non-Verbal I.Q. Score

The Canadian Lorge-Thorndike Intelligence Test and the Wechsler Intelligence Scale for Children-Revised (WISC-R) were used to select subjects who were within the average range of intellectual ability. The scores for the average and learning disabled groups fell between (83-118) and (83-120) respectively. The mean I.Q. for the average group was 101.1 and the mean I.Q. for the learning disabled group was 96.1. Since the Verbal Battery of the Lorge-Thorndike Intelligence Test requires reading in order to do the subtests, only the Non-Verbal Battery scores were used to ensure that the I.Q. score did not reflect reading achievement.

The Canadian Lorge-Thorndike Intelligence Test provides a valid measure of intelligence for most children. Some children, however, do not perform well on group tests and can be more reliably measured by individual tests where the examiner has some degree of control over outcome variables such as inability to follow directions, lack of motivation and high distractability. Since learning disabled children are particularly vulnerable to the confounding of scores due to external variables, individual I.Q. scores were substituted for the Canadian Lorge-Thorndike Intelligence Test scores whenever they were available in the schools. All individual intelligence scores used in this study were derived from the Performance Subtests of the Wechsler Intelligence Scale for Children-Revised (1974). Hence, while the undesirability of comparing

I.Q.'s from different tests was recognized, WISC-R scores were nonetheless used whenever they were available in order to ensure that the best estimate of each child's intelligence was used.

A t-test for independent means was used to determine whether there were any significant differences in intellectual functioning between the learning disabled and average group. (Table 1)

The results of the analysis revealed that there were no significant differences between the two groups at the .05 level. This helped to ensure that intellectual functioning was not a factor in differences between the average and learning disabled groups.

2. Reading Achievement

Teacher ratings as well as the results of the Gates-MacGinitie Reading Test were used to provide a measure of reading achievement. Reading comprehension in this study was defined as the extent of consistency between the readers' reconstructions of and elaborations upon the text, and the author's intended meaning. Since this study focused on comprehension monitoring, only the results from the comprehension section were used. These results were found to compare favorably to teacher ratings.

Since the design of the study required the stories to be at instructional and frustration levels for the subjects, only students whose reading scores fell between grades 3.7 and 4.7 were selected. The mean reading level for both groups was 4.1 with the scores for the average and learning disabled samples ranging from grades 3.7 to 4.7 and 3.7 to 4.6, respectively. The median score for both groups was 4.1 although a slightly uneven dispersion occured at the upper levels where the learning disabled students were more frequently reading at the

Table 1

T-TEST FOR I.Q. OF READING ACHIEVEMENT GROUPS

Learning Disabled Readers		Average Readers		
Mean	S.D.	Mean	S.D.	T-Value
96.1	9.4	101.1	10.6	1.59

4.2 to 4.4 grade levels while relatively more average students read at the 4.4 to 4.7 grade levels.

3. Sex

An attempt was made to obtain equal numbers of boys and girls. The average and learning disabled groups each consisted of nine girls and eleven boys.

4. English Language Fluency

Subjects with non-English backgrounds who had not achieved fluency and adequate understanding of the English language were excluded. This information was obtained from classroom teachers.

5. Other Factors.

Children with severe speech, hearing, or emotional disorders were also excluded from the study.

The non-verbal score on the Canadian Lorge-Thorndike Intelligence Test or on the performance scale of the Wechsler Intelligence Scale for Children-Revised, as well as the comprehension score on the Gates-MacGinitie Reading Test, the sex and chronological age of each subject are provided in Table 2 for the learning disabled group, and in Table 3 for the average group.

Testing Instruments

Results from the Gates-MacGinitie Reading Test, Level D, Form 2, Canadian Edition (1980); the Canadian Lorge-Thorndike Intelligence Test, Level B, Form 1 (1967); and the Wechsler Intelligence Scale for Children-Revised (1974) were used in this study. These results were obtained from the cumulative records at each school. The Gates-MacGinitie Reading Test was administered by classroom teachers in January, 1983. The Canadian Lorge-Thorndike Intelligence Test is

Table 2

BACKGROUND INFORMATION ON LEARNING DISABLED READERS

Subject	Sex	Comprehension Grade Score (Gates-MacGinitie)	Non-Verbal I.Q. Score (Lorge-Thorndike or WISC-R)	C.A. May, 1983
21	F	4.4	84	11.2
22	F	4.2	99	12.11
23	F	3.7	101*	12.2
24	M	3.7	84	11.11
25	M	4.6	102*	11.2
26	M	4.4	107	12.0
27	M	3.8	89	11.11
28	F	3.7	91	12.10
29	F	4.3	107	11.9
30	F	4.4	83	12.1
31	M	3.9	93	11.5
32	M	3.8	105*	11.10
33	F	4.2	97	11.4
34	M	4.4	96	11.8
35	M	4.5	87*	12.5
36	M	3.8	98	12.2
37	M	4.4	101*	12.6
38	F	4.5	89	11.6
39	M	3.7	90	11.7
40	F	3.9	120	12.0
Mean		4.1	96.1	11.9

*Asterisk indicates WISC-R score.

Table 3

BACKGROUND INFORMATION ON AVERAGE READERS

Subject	Sex	Comprehension Grade Score (Gates-MacGinitie)	Non-Verbal I.Q. Score (Lorge-Thorndike or WISC-R*)	C.A. May, 1983
01	F	4.7	112	10.0
02	F	4.4	96	9.11
03	M	4.5	115	9.11
04	F	4.7	92	9.10
05	F	3.8	107	10.0
06	F	4.4	99	9.4
07	F	3.7	109	10.0
08	M	4.7	96	9.10
09	M	3.9	96*	9.9
10	M	3.9	90	9.11
11	M	3.7	84	10.4
12	M	4.4	101	9.4
13	F	4.6	97	9.4
14	M	4.7	83	10.9
15	F	3.7	104	10.3
16	M	3.7	91	9.11
17	F	4.5	103	9.7
18	M	4.0	118*	9.9
19	M	3.9	116	9.10
20	M	3.9	115	9.9
Mean		4.1	101.1	9.8

*Asterisk indicates WISC-R score.

administered routinely by classroom teachers to all grade four students in the Edmonton Catholic School District and was thus administered to the learning disabled and average groups in October, 1982 and October, 1980 respectively. The Wechsler Intelligence Scale for Children-Revised was administered individually by the North East Area school psychologist upon referral by classroom teachers.

Reading Achievement

A measure of each subject's reading achievement was obtained from the results of the Gates-MacGinitie Reading Test, Level D, Form 2, Canadian Edition (1980). This test consists of two parts, vocabulary and comprehension. Only the results from the Comprehension Subtest were used.

The Comprehension Subtest measures the ability to read prose passages with understanding. Each passage is followed by two questions and four alternate answers for each question. The correct answers are to be selected. The subtest is timed but abundant time is provided for most children to complete all of the passages.

The Canadian Edition of the Gates-MacGinitie Reading Test is based on the Second Edition of the Gates-MacGinitie Reading Test published in the United States in 1978. The 1978-79 Canadian norms were developed from the results of testing 46,000 students throughout the ten provinces and the Yukon. To assure test validity, all items were examined by a group of Canadian educators for their appropriateness to Canadian education. Vocabulary words were selected from commonly used reading series, and the content of the comprehension passages was chosen in relation to the knowledge and interests of students according to a plan that specified the proportion of natural science, social science, humanities, and narrative material for each test. Approximately twice the required number of literal and inferential questions were written to test understanding of the passages and after an extensive tryout, only those items of appropriate difficulty and usefulness were retained.

Kuder-Richardson Formula 20 reliability coefficients were computed for each test level from the Canadian standardization data. The K-R 20 coefficients ranged from 0.85 to 0.94 for Vocabulary, and from 0.85 to 0.92 for Comprehension.

Intellectual Functioning

To obtain a measure of each subject's intellectual functioning, results from the Canadian Lorge-Thorndike Intelligence Test, Level B, Form 1 (1967) were used. When they were available, results from the Wechsler Intelligence Scale for Children-Revised (1974) were used in lieu of the Canadian Lorge-Thorndike Intelligence Test Scores. Each test provides both verbal and non-verbal I.Q.'s. Only the non-verbal I.Q.'s were used in the sample selection.

1. Canadian Lorge-Thorndike Intelligence Test

The Non-Verbal Battery contains pictorial or numerical items. There are three subtests: pictorial classification, pictorial analogy, and numerical relations.

The test was normed on a stratified random sample of 31,739 students in grades three to nine from across Canada. Validity was established by correlating scores to those obtained on individually administered tests such as the Stanford-Binet Intelligence Scale and the Wechsler Intelligence Scale for Children. The odd-even reliability for Levels A to F of the Verbal Battery ranges from 0.830 to 0.945 and from

0.894 to 0.931 for the Non-Verbal Battery. The intercorrelations between Verbal and Non-Verbal Batteries for Levels A to F range from 0.558 to 0.681.

2. The Wechsler Intelligence Scale for Children-Revised (WISC-R)

The widely used WISC-R, which is designed for use with children aged from six to 16 years, is a 1974 revision of the WISC. Its normative sample consisted of 220 children purportedly representative of the American national population as of 1970 with respect to race, geographic region, occupation, head of household and urban/rural residence.

Like its predecessor, the WISC-R provides both a Verbal and a Performance I.Q. in addition to a Full Scale I.Q. score. This makes it a valuable test for use with individuals who have language difficulties. The performance subtests involve a manipulation of objects (for example, making geometrical configurations with blocks) rather than an oral or written response. Split-half reliability coefficients between the Full Scale score, the Performance score, and the Verbal I.Q. score have shown that the use of any of the three scores is satisfactory for the measurement of individuals. Only the Performance score was used in this study because this subscale attempts to measure the same areas which are measured by the non-verbal subscale of the Lorge-Thorndike Intelligence Test (i.e. non-verbal receptive and expressive intelligence).

The Experimental Test Instruments

Construction of the Instrument

Stories. Two stories entitled "The Case of the Gypsy Fortune-Teller" and "The Treasure Riddle Mystery" were selected from the Martin

Mooney Mystery Series for their high interest levels and were subsequently modified. The modified stories were textually similar narratives of the type generally found in basal readers at the grades four, five, and six levels. The plot of each story consisted of the introduction of a mystery and the subsequent presentation of clues which led to its resolution by a young boy.

One low grade four (instructional level) story and one high grade six (frustration level) story were required for the study. Two readability measures, Fry's readability formula and a cloze procedure, were used to ensure that the modified stories met these criteria. The application of Fry's readability formula to the final drafts of the stories yielded grade equivalents of 4.0 for "The Case of the Gypsy Fortune Teller," and 6.8 for "The Treasure Riddle Mystery". Every tenth word was deleted from the final draft of each story and the grade four and grade six level stories were administered as a cloze exercise to one grade four and one grade six class respectively in January, 1983. A class average of between 40 and 60 percent of exact text replacements on a minimum of 50 blanks is considered to be a good indicator that the text is at an appropriate grade level for the students (Guszak, 1972, p. 126). On this task, the grade four class produced an average of 52 percent exact text replacements on a total of 55 blanks; while the grade six class produced an average of 47 percent exact text replacements on a total of 69 blanks.

The results of these measures indicated that "The Case of the Gypsy Fortune Teller" was sufficiently easy to be at instructional level for all of the subjects in the study, and that "The Treasure Riddle Mystery" would be at frustration level.

The stories were each divided into three sections which were typed on separate pages (see Appendix A for the stories).

Questions. In this study the use of a lookback strategy to monitor comprehension and rectify misunderstanding was a variable measured by observed lookbacks and the accuracy of responses to the lookback questions. In order to determine the true effect of the lookback strategy on comprehension, it was necessary to compare each subject's performance on the lookback questions to his/her performance on similar questions where the use of a lookback strategy was not required to correctly answer the questions. Hence, adequate performance on the control questions accompanied by relatively poor performance on the lookback questions could be assumed to be due to the inadequate use of a lookback strategy. The questions were thus an important element of the instrument. In order to obtain a reliable measure of the lookback strategy, it was imperative that the lookback questions did necessitate the rereading of previous parts of the stories, and that the control questions had the same processing requirements as the lookback questions but differed only in that rereading was not necessary to produce a correct response.

A total of ten questions consisting of four lookback and six non-lookback questions were developed for each story. Of the ten questions, five involved recalling specific details from the stories and five were inferential in nature. (The questions to both stories are included in Appendix A.)

Stops. As an additional measure of comprehension monitoring, red dots, at which the children were to stop reading and verbalize any misunderstanding, were inserted at selected points within each story.

An effort was made to place the stops at points where comprehension monitoring might be occurring naturally if the children were active readers (See stories in Appendix A for placement of dots.).

Pilot Study

A pilot study was conducted in March, 1983 to further determine whether the readability levels of the stories were appropriate and to see if the instrument provided an adequate measure of comprehension monitoring. The pilot study sample was comprised of four average and four learning disabled students who were not in attendance at schools used in the actual study.

The result of the pilot study confirmed the appropriateness of the grade six story and the overall suitability of the measures of comprehension monitoring. Some of the mechanics of administration, such as the use of a high table and the positioning of the pages at 90° angles from the body were tried and found useful. Several changes were also suggested from the results of the pilot study.

1. The grade four story was rewritten to ensure that all of the subjects would be able to read it without any difficulty. While the cloze procedure had shown the grade four story to be adequately easy and the application of Fry's readability formula had placed it in the early to mid-grade four level, several of the students in the pilot study experienced some degree of difficulty reading this story. As it was important for the final draft of the story to be at instructional level for all of the students, easier words were substituted for some of the vocabulary, and adjustments were made in the length and complexity of the sentences. The final selection ranged from a grade level of 3.8 to 4.1 on Fry's formula. The narrative content of the story was

found to be appropriate and was retained.

2. The induced monitoring task was also changed. In the pilot study questions such as, "How could you find the answer to that question?" and "In what part of the story might you find the answer to that question?" were used after each incorrect response in an effort to induce the students to independently use a lookback strategy to correct misunderstanding. While this method did lead even the poorest monitors to use alookback strategy, it was found that by the completion of the first story all of the students were spontaneously using the strategy. As a result, all of the subjects scored significantly better on the second story than on the first. While this was a rewarding discovery in that it indicated the potential for both learning disabled and younger grade four students to quickly learn to use a lookback strategy, the learning effect interfered with obtaining a measure of the children's spontaneous comprehension monitoring. Consequently, in the actual study, both stories were completed without questioning or probing by the examiner and the induced task was subsequently applied to the grade four level questions which had been incorrectly answered.

3. Three questions were changed because two of the eight students could answer them correctly without using a lookback strategy.

After the incorporation of the above specified changes, the instrument was retested on four children and found to be suitable.

Administration of the Instrument

Students were seen individually in May, 1983 for single sessions of approximately one hour in duration. The sessions were tape recorded and later transcribed. In order to alleviate any concerns about being tested, as well as to encourage maximal cooperation, each session was prefaced by a brief discussion in which the student was introduced to the nature of the task at hand and reassured that the purpose for requesting his/her cooperation was not to test him/her but rather to assist the researcher in learning more about "how children become good readers." Prior to beginning the session, each child was asked if he/she wished to volunteer to assist the researcher by performing the reading tasks. All of the students chose to cooperate.

In order to facilitate the scoring of lookback behavior, students were seated across from the researcher at a high table. To control for any order of presentation effects, the average and learning disabled subjects were each randomly assigned to two subgroups for the administration of the instrument. Half of the average and half the learning disabled sample were administered "The Case of the Gypsy Fortune-Teller" (instructional level story) first, while the remainder of the sample began with "The Treasure Riddle Mystery" (frustration level story).

Three measures of spontaneous comprehension monitoring were administered in an alternating sequence, and a fourth measure of induced comprehension monitoring was administered at the end of the sessions. Following is a brief description of the administration of each of the four measures.

Thinking Aloud Task. Each page contained four red dots. The subjects were instructed to stop reading as they reached each dot and to tell the researcher anything about which they might be wondering. They were asked if anything they had read was unclear or did not seem to make sense to them. Monitoring obtained through this measure was reflective of the children's ongoing monitoring of their comprehension as they actively read the stories. Examples of monitoring at this stage include: "Why did she say the crystal ball needs to regain its powers? Why is that? Crystal balls don't need to regain power!"; and "First they were talking about Michelle [actually Michael] and then they say 'he'. That doesn't make sense, it should be 'she' for a girl."

The directions given to the subjects as well as the samples which preceded the presentation of the tasks are enclosed in Appendix A.

The Use of a Lookback Strategy. Questions were presented orally after the reading of each page and the subjects were observed to see if they used a lookback strategy to answer the questions.

After each page was read silently by the subjects, it was placed on the table by the researcher. Pages one and two were placed at 90° angles to each subject's left and right respectively, while page three was left directly in front of him. The combination of a high table and turned pages caused the children to physically move or pick up the pages in order to reread them thus simplifying the observation of lookback behavior and mitigating the possibility of errors in scoring.

The directions which preceded the questions are included in Appendix A.

Statement of Certainty. Prior to the presentation of the questions, the subjects were informed that regardless of the accuracy of their response they would always be asked if they were sure of their answer. Each response to a question was subsequently followed with "Are you sure?". This stage of monitoring was intended to disclose possible differences between the average and learning disabled groups' ability to recognize when they were not correct in their answer to a question. Asking the students if they were sure of their answer frequently prompted them to reread in order to check the accuracy of their response, especially when they really did not know the answer. However, since the questioning about the contents of the stories was intended to provide data about the student's spontaneous monitoring, questions which were corrected through rereading after the prompt were noted but scored as incorrect since the strategy had not occured spontaneously.

Instructions to the students are included in Appendix A.

Induced Comprehension Monitoring Task. After the completion of both story tasks, the subjects' attention was returned to the "Case of the Gypsy Fortune Teller" (fourth grade level story) and the story pages were returned to their positions on the table for the induced monitoring task. The purpose of this task was to determine whether children who did not consistently use a lookback strategy to monitor their comprehension knew of such a strategy. When they knew of a lookback strategy but had not spontaneously used it, the task was continued to determine whether cuing could induce the strategy use and what extent of cuing would be required to do so.

Firstly, subjects were asked how they could check their work if they weren't sure of an answer, or if their response to a question was wrong. Those who reported that they could skim or reread parts of the story were subsequently asked to redo those questions for which they had supplied incorrect responses. Six progressively more direct cues were provided until a lookback strategy was induced.

The cues consisted of: (1) simply repeating the question; (2) asking the child if he/she was certain of his/her answer; (3) telling the child that his/her answer was not quite right; (4) asking how he/she could check his/her answer; (5) asking where in the story he/she might locate the answer, or a clue which could help him/her to decide upon the correct response; and (6) if none of the previous cues had prompted the child to independently search for the answer, he/she was then instructed to use a lookback strategy to locate the needed information.

The subjects' cueing needs on a continuum which ranged from merely repeating the question, all the way to actually telling him/her to locate the necessary information, were determined for each question.

A copy of the scoring sheet is included in Appendix A.

Scoring of the Instruments

Percentage scores on the non-lookback questions were computed for each story to provide a measure of the student's comprehension of the stories. The mean scores for the average and learning disabled groups on the fourth grade story were 71.7 percent and 71.6 percent respectively, indicating that the story was at instructional level for both groups. The mean percentage scores on the sixth grade story were 49.1 for the average group and 55.8 for the learning disabled group confirming that this story was at frustration level for both groups.

Several scores of comprehension monitoring were obtained.

Thinking Aloud Task. Responses to the Thinking Aloud Task were each analyzed and classified under one of four categories which included: (1) monitoring, (2) no response, (3) predicting, or (4) text repetitions. Responses classified as predictions were generally statements of anticipation of future story action. For instance, on the grade six level story, subject 14 wondered if "Maybe in the treasure there's only boots and things like that" and, subject 03 anticipated the discovery of a treasure as the boys started through the cave opening, "How good it would be finding all that treasure."

Monitoring responses were further subdivided into three categories. The first category consisted of monitoring when mechanics such as punctuation, passage construction, or word identification interfered with comprehension. For instance, subject 20 wondered what a tur ban (turban) was, and subject 17 became confused early in the grade six passage and thought that since it was "Christmas and then January, they should have put first it was Christmas and now it's January."

The second subcategory of monitoring responses consisted of those responses in which the need for more information was recognized. While some of these responses closely resembled predictions, they were none-the-less coded as monitoring on the basis that comprehension was interfered with and the child recognized the need for more information to clarify his/her understanding of the story. For example, subject 22 wondered "What Aunt Emily was going to see that she never seen before." Other examples of subcategory two monitoring are: subject 21 wondered if it was true that the crystal ball needed five minutes to regain its powers. In this case the student was not questioning the reality of crystal balls regaining powers but felt that he needed to know whether the fortune teller had lied about it or if she was telling the truth. Subject 27 on the other hand, wanted to know why Aunt Emily would get a fortune told, why the gypsy would wear a bright yellow turban on her head, what Joey grinned at, why there would be a hole in the wall, etc.

The third subcategory of monitoring included only responses wherein the child noted an inconsistency in information so that something did not make sense to him/her. Examples include subject 25 who wondered "If there's snow on the ground how can he see the grass and moss?" and subject 27 who questioned, "why she'd get a fortune told three times in a row?".

After the monitoring responses had been analyzed and categorized, subjects were given three scores consisting of their total number of responses in each of the subcategories of monitoring. A total monitoring score which was obtained by totalling the number of monitoring responses in the subcategories was also calculated. This made it possible to compare groups not only on the basis of their mean numbers of monitoring responses produced, but also allowed comparisons as to the nature of specific information which the two groups saw as presenting obstacles to comprehension. A fifth score was also computed by totalling the number of responses in subcategories one and three only. Subcategory two monitoring was found to be important to the study but somewhat problematic in that students who had been taught to make predictions as they read frequently stated or implied a need to know more. While it is questionable to call these responses monitoring, to exclude such statements consistently would have eliminated from the study true confusions due to a lack of information. Hence, it was deemed a better alternative to include these responses in the coding and to compute separate scores both including and excluding them.

Sureness Responses. As a second measure of recognition that they had or had not understood, subjects were asked if they were sure of their responses to the questions. A score of one was given for each correct answer which was accompanied by a statement of sureness, and for each incorrect answer which was accompanied by an indication that it might be wrong. A score of zero was given when students either were correct but thought that their answer might be wrong, or when incorrect responses were accompanied with statements of sureness.

Verbal Knowledge of a Strategy. In order to determine whether children who did not spontaneously use a lookback strategy knew of the strategy, each subject was asked how he/she might correct an incorrect response, or check an answer if he/she was unsure of its accuracy.

A score of one was given to subjects who knew how to resolve inconsistencies by using a lookback strategy, while a zero was assigned if they did not know what to do. These scores were used to compare each group's verbal knowledge of a lookback strategy.

Lookback Questions. In order to obtain a measure of the children's functional knowledge of a lookback strategy, a score of one was given for each of the lookback questions for which a lookback strategy was used to answer the question. Since this measure was intended solely to indicate the frequency of strategy use, and not its effectiveness, scores were given regardless of the accuracy of responses.

The lookback questions also provided several measures of the effectiveness of the lookback strategy when it was used. First, a score of one was given for each of the lookback questions answered correctly. Scores for this measure were given for all correct responses regardless of whether a lookback strategy had been used since students who did not use a lookback strategy but obtained the correct response either remembered the information and hence appropriately did not execute lookback behavior, or alternatively, they used a rethink strategy which was effective for them. The maximum score obtainable for each story was three.

One lookback question on each story was found to be problematic.

Question seven on the grade six story was too easy, while question three on the grade four story was too difficult for most of the subjects. To obtain effective strategy scores without the confounding effects of these questions, scores were computed with the elimination of the problematic questions. A maximum score of three could be obtained for each story with these questions eliminated.

A second measure of effective use of a lookback strategy was procured to ascertain whether there were differences in the groups' knowledge of where to look for the necessary information and in their execution of a lookback strategy to locate this material. The children's performances were observed as they used a lookback strategy and notations were made of each page that was reread. Lookback strategy use was later scored as efficient when the subject went immediately to the appropriate page for the information, or when he/she systematically skimmed the pages to find an obscure detail. Strategy use was scored as inefficient when the subject haphazardly moved from one page to the next, or read entire pages over until he/she happened upon the needed information. Since this measure involved the subjects' facility to locate the necessary information, the accuracy of the answers was considered irrelevant to the assignment of scores. Lookback questions on which no lookback strategy had been used were excluded for this measure and a score based only upon the number of times a lookback strategy had been used to answer lookback questions was determined.

A third measure of effective strategy use was obtained in order to compare the groups on their ability to make use of information once it was located. Notes indicating the children's ability or inability to locate information were taken while the students answered the questions. Later, a score of one was assigned to each lookback question for which information had been located and resulted in a correct answer. A score of zero was assigned when information was located but did not lead to a correct answer. This measure was primarily useful for the inference questions, where the manipulation of one or more pieces of information was required. Some students knew where to look for information and could easily locate it, but were unable to decide how to transform it in order to correctly answer the question. Hence, while these students could execute a lookback strategy, it was not always beneficial for them to do so. For this measure, lookbacks on which the subjects had not been able to locate the required information were excluded. A score based only upon the number of lookback questions for which information had been located was computed.

Cued Task. A cued task was used to see if subjects who verbally knew of a lookback strategy, but who had failed to spontaneously use it to answer some questions, could be induced to use a lookback strategy.

First, a score of functional use of the strategy was determined. Scores ranging from zero to six, depending upon the number of cues required to induce the strategy, were given for each question. A score of six indicated that repeating the question had been sufficient to induce use of the strategy, while a score of zero indicated that the subject could not be induced to use it.

Average scores for functional use were then computed by totalling the scores for each question and dividing by the total number of questions for which the cued task had been used with the subject.

A measure of the effectiveness of the strategy when it could be induced was then computed. To obtain this score, the percentage of correct responses was calculated, excluding any questions for which a lookback strategy could not be induced.

Analysis of the Data

The Division of Educational Research Services at the University of Alberta assisted with the statistical analysis of the data. A two-way analysis of variance with repeated measures across the two stories (ANOV 26 Program) was used to test the hypotheses set for the study.

A Statistical Pact of Statistical Sciences (SPSS) t-test program was used to test for differences between the learning disabled and average groups on the cued task and to more succinctly delineate significant differences obtained on some of the two-way analyses of variance.

To determine whether there was a significant difference between the groups based on their I.Q. scores and to get the means, and standard deviations among the groups, an SPSS t-test program was also used.

Qualitative data obtained from student response sheets was used when deemed appropriate.

Because this study involved both qualitative and quantitative data, it was deemed reasonable to identify trends as well as statistical differences. For the purpose of this study, trends were reported when qualitative data were definitive or were supported by descriptive statistics and/or statistical analyses which were significant at the 0.1 level.

Summary

In summary, a sample of 40 students was selected from six schools within the Edmonton Catholic School District. Test scores available from each school's cumulative records, as well as teacher ratings, were used to select subjects on the basis of average intelligence and a reading score ranging between grades 3.7 to 4.7. Twenty subjects were average grade four students, and 20 were learning disabled grade six students.

A pilot study in March, 1983 was helpful in refining the testing instrument and in determining the feasibility of using the stories to assess comprehension monitoring.

The instrument consisted of one grade four (instructional level) story, and one grade six (frustration level) story. Several measures of comprehension monitoring were obtained as the subjects read each story and answered comprehension questions. Comprehension monitoring through the use of a lookback strategy was then induced for any subjects who had verbal knowledge of a lookback strategy, but who did not consistently use the strategy spontaneously.

Scores were obtained to provide: (1) an indication of the subjects' awareness of a lookback strategy to monitor comprehension; (2) their spontaneous and induced use of the strategy; and (3) their effectiveness in using the strategy. Scores of comprehension monitoring as the children read two stories were also obtained.

Data were analyzed by a two-way analysis of variance with repeated measures (ANOV 26 Program), SPSS t-tests for independent means, and qualitative data.

CHAPTER 4

FINDINGS OF THE STUDY

The purpose of this study was to examine the comprehension monitoring abilities of average and learning disabled readers when reading instructional and frustration level text. This chapter examines comprehension monitoring data obtained from 20 average grade four students and 20 learning disabled grade six students. The results from three types of statistical treatments are presented: (1) tables containing summaries of several analyses of variance used in the study are provided; (2) the mean scores obtained by each group on each of the measures used are reported; and (3) tables summarizing the results of t-tests, which were computed to compare the groups on tasks which were used at only one passage level or to delineate the source of significant differences obtained on some of the two-way analyses of variance, are also provided. The level of significance for the study was set at .05. Interpretations of these quantitative analyses were supported and/or advanced whenever appropriate by qualitative data obtained from the performance records of the children.

The findings are reported in relation to three aspects of monitoring: (1) recognition of miscomprehension; (2) knowledge of a lookback strategy; and (3) effective use of a lookback strategy. Each section includes a restatement of the hypotheses, representations of the statistical data used to accept or reject the hypotheses, a report of the results of the analyses, relevant descriptive data, and a discussion pertinent to the findings.

Recognition of Miscomprehension

Each of hypotheses 1, 2 and 3 was concerned with the recognition of miscomprehension. Several measures were used to obtain data on this aspect of comprehension monitoring. A two-way analysis of variance with repeated measures across passage levels was performed on each of these data. The three hypotheses are restated below indicating the specific dependent variables involved.

Hypotheses

1. There is no significant difference between average and learning disabled readers on monitoring as indicated by:
    a. recognition of miscomprehension on
        i. total monitoring at stops
        ii. monitoring at stops due to mechanics (such as punctuation or word analysis)
        iii. monitoring at stops due to insufficient information
        iv. monitoring at stops due to perceived semantic inconsistencies
        v. percentage correct on sureness of response task.
2. There is no significant difference between performance on instructional and frustration level materials on monitoring as indicated by:
    a. recognition of miscomprehension on:
        i. total monitoring at stops
        ii. monitoring at stops due to mechanics (such as punctuation or word analysis)
        iii. monitoring at stops due to insufficient information
        iv. monitoring at stops due to perceived semantic inconsistencies
        v. percentage correct on sureness of response task.

3. There is no significant interaction effect between reading achievement and level of material on monitoring as indicated by:
    a. recognition of misunderstanding on:
        i. total monitoring at stops
        ii. monitoring at stops due to mechanics
        iii. monitoring at stops due to insufficient information
        iv. monitoring at stops due to perceived semantic inconsistencies
        v. percentage correct on sureness of response tasks.

Results

Total Monitoring at Stops. The results of the two-way analysis of variance with repeated measures across passages used to determine the total amount of monitoring at stops are presented in Table 4. The cell means are included in Table 5. The main effects for groups were significant at the .05 level, suggesting that the average readers were significantly more cognizant than were learning disabled readers of occasions when they did not comprehend. The main effects for passage levels were not significant, and the interaction effects of groups and passage levels were also not significant. On the basis of these results, hypothesis 1a.i was rejected but hypotheses 2a.i and 3a.i were accepted.

While these data suggested that the average readers were more sensitive to occasions of not understanding, further analyses were computed to determine more specifically how the groups differed from one another. The total score was comprised of subscores obtained on: (1) monitoring of mechanics, (2) recognition of the need for more information, and (3) perceived semantic unacceptability of textual information. A two-way analysis of variance with repeated measures

Table 4

Two-Way ANOVA With One Factor Repeated For Total Monitoring at Stops

Source of Variation	df	MS	F	P
Between				
Groups - A	1	115.200	4.695	.036
Subj, within groups	38	24.536		
Within	40			
Instruction-Frustration level - B	1	0.450	0.279	.600
Group x levels (AxB)	1	0.200	0.124	.727
Levels x subj within groups	38	1.614		

Table 5

Cell Means for Total Monitoring at Stops

	Grade 4 passage	Grade 5 passage
Average readers	4.750	4.500
L.D. readers	2.250	2.200

Table 6

Two-Way ANOVA With One Factor Repeated For Monitoring Due to Mechanics of Text

Source of Variance	df	MS	F	P
Between				
Groups - A	1	.313	.639	.428
Subjects, within groups	38	.489		
Within	40			
Instructional - Frustration levels - B	1	.613	2.565	.117
Groups x levels (AxB)	1	2.812	11.777	.001
Levels x subjects within groups	38	.239		

	Mean Scores	
	Grade 4	Grade 6
Average Readers:	7.50	2.00
Disabled Readers:	2.50	4.50

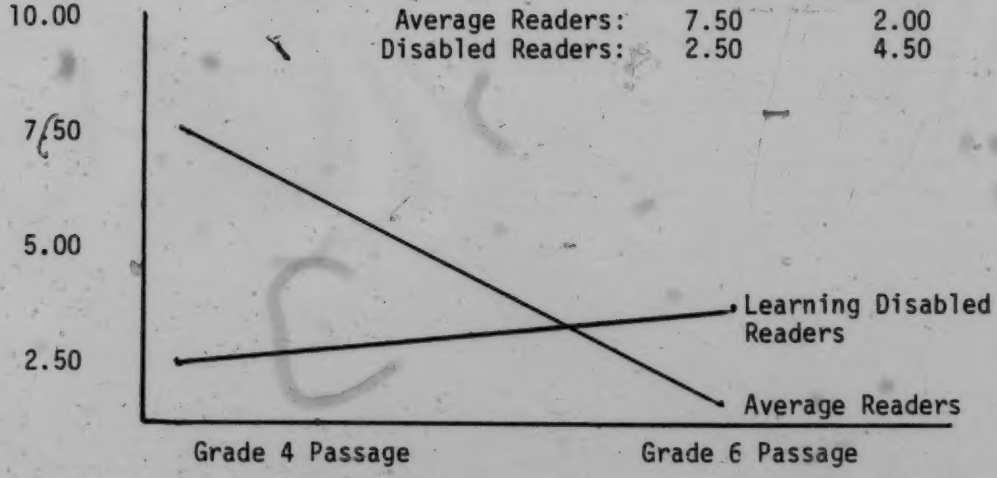

Figure 2. Interaction Effects for Monitoring of Text Mechanics

across passage levels was performed on each of these subscores in order to help determine whether the significant main effects obtained for groups were due to a particular pattern of monitoring, or to overall performance. The results from each of these data will now be dealt with individually.

Monitoring at Stops Due to Mechanics. A two-way analysis of variance with repeated measures across passages was conducted to determine whether there were significant differences in the recognition of miscomprehension due to the mechanics of the text (i.e., unknown words, misleading punctuation, unclear referents, etc.). The results of this analysis are indicated in Table 6. The main effects for groups and for passage levels were not significant although the interaction between these two factors was significant. The cell means are included in Figure 2 which also represents the interaction of the two variables. On the basis of these results hypotheses 1a.ii and 2a.ii were accepted but 3a.ii was rejected.

To further explicate the significant interaction effect, t-tests were computed to determine whether differences between the groups were significant at each passage level. The results of the t-tests are stated in Table 7. These results indicate that while reading the instructional (grade four) level passage, average students were significantly more cognizant than were learning disabled students of occasions of miscomprehension due to mechanics. However, when reading the frustration level passage, differences between the groups were not significant.

Monitoring at Stops Due to Insufficient Information. A two-way analysis of variance with repeated measures across passage levels was

Table 7

T-Tests for Independent Means Comparing Average and Learning Disabled Readers' Monitoring of Text Mechanics

	Means		Standard Deviation				
	Average	Learning Disabled	Average	Learning Disabled	df	T	Probability 2-Tail
Grade 4 level passage	7.50	2.50	0.639	0.550	38	2.65	0.012
Grade 6 level passage	2.00	4.50	0.410	0.759	38	-1.30	0.203

conducted to determine whether there were significant differences between groups and between passages in the awareness of miscomprehension due to a lack of information. The results of this analysis are represented in Table 8 and the cell means are included in Table 9. The main effects for passage levels and groups as well as the interaction effects between groups and passage levels were not significant and hence, hypotheses la.iii, 2a.iii and 3a.iii were accepted. The main effects for groups, however, did approach significance with average readers recognizing a need for more information more frequently than did learning disabled readers.

Monitoring at Stops Due to Perceived Semantic Inconsistencies. A two-way analysis of variance with repeated measures across passage levels was conducted to determine whether there were significant differences between groups and between passages on the awareness of miscomprehension due to perceived semantic inconsistencies. A representation of the results of this analysis is given in Table 10, and the cell means are presented in Figure 3. Neither the main effects for groups or for passage levels reached significance at the .05 level set for this study, and the interaction between groups and passage levels was also not significant. Hence, hypotheses la.iv, 2a.iv and 3a.iv were accepted. An examination of the cell means, however, did indicate a trend in the expected direction, with average readers monitoring semantic content more than three times as often as learning disabled readers on the instructional level passage, and nearly twice as frequently on the frustration level passage. Hence, while the differences between groups were not statistically significant, a trend was noted wherein average readers were somewhat more sensitive than

Table 8

Two-Way ANOVA With Repeated Measures on

Monitoring Due to Insufficient Information

Source of Variation	df	MS	F	P
Between				
Groups - A	1	74.113	3.583	0.066
Subjects, within groups	38	20.686		
Within	40			
Instruction - Frustration level - B	1	1.012	0.527	0.472
Groups x level (AxB)	1	1.512	0.788	0.380
Levels x Subjects within groups	38	1.920		

Table 9

Cell Means for Monitoring Due to Recognition

of the Need for More Information

	Grade 4 passage	Grade 5 passage
Average readers	3.50	3.55
L.D. readers	1.85	1.35

Table 10

Two-Way ANOVA With Repeated Measures on Monitoring Due to Perceived Semantic Inconsistencies

Source of Variation	df	MS	F	P
Between				
Groups - A	1	2.450	2.053	0.160
Subjects, within groups	38	1.193		
Within	40			
Instruction - Frustration Level - B	1	1.250	1.450	0.235
Groups x levels (AxB)	1	0.000	0.000	1.000
Levels x subjects within groups	38	0.862		

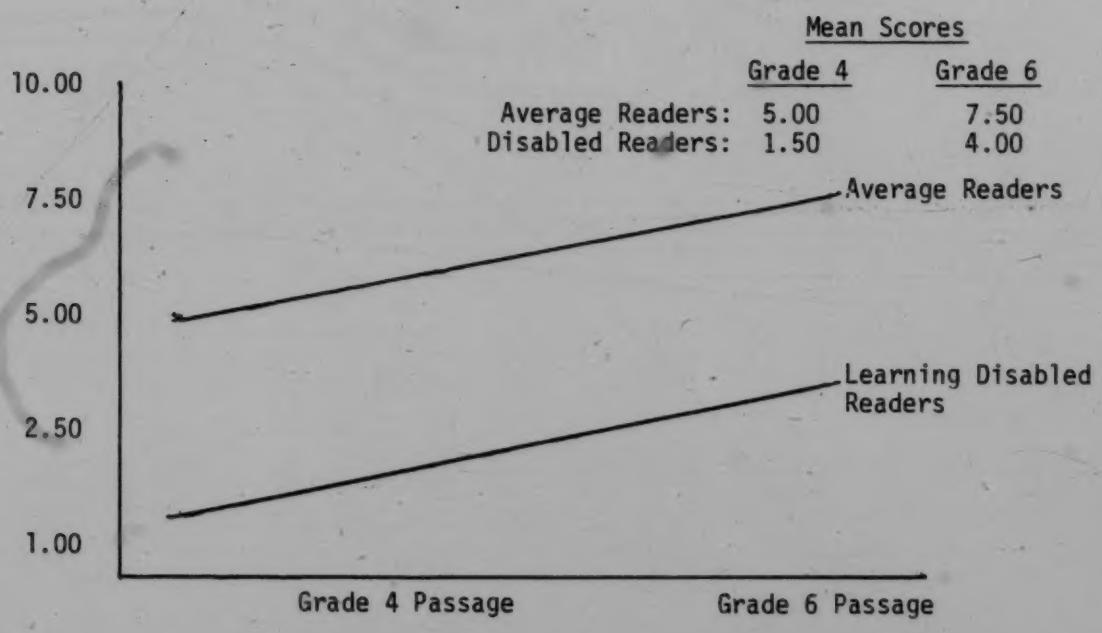

Figure 3. Average and Learning Disabled Readers' Monitoring Due to Perceived Semantic Inconsistencies

learning disabled readers to occasions of miscomprehension due to semantic confusion. A trend in the expected direction was also noted across passage levels, with both reading achievement groups doing more monitoring for semantic inconsistencies when reading the frustration level passage. At frustration level, learning disabled readers more than doubled the frequency of semantic monitoring reponses which they had made on the instructional level passage, and the number of semantic monitoring responses by average readers increased by one half of the number reported at instructional level. A representation of these data can be seen in Figure 3.

Percentage Correct on Sureness of Response Task. A two-way analysis of variance with repeated measures across passage levels was conducted to determine whether there were any significant differences in the degree of sureness about the accuracy of responses to the questions. The results of this analysis are presented in Table 11, and the cell means are provided in Table 12. The main effect for groups did not reach the .05 level of significance, and the interaction between groups and passage levels was also not significant. The main effect for passage levels, though, was highly significant, indicating that both average and learning disabled readers were better able to judge the accuracy of their answers to questions when reading the instructional level passage. On the basis of these findings, hypotheses 1a.v and 3a.v were accepted, but 2a.v was rejected.

Summary and Discussion of Results

Successful comprehension monitoring for readers involves, (1) awareness of occasions of not understanding, (2) knowing about corrective strategies with which to ensure that comprehension continues

Table 11

Two-Way ANOVA With Repeated Measures on the Degree of Sureness About Accuracy of Responses

Source of Variation	df	MS	F	P
Between				
Groups - A	1	0.115	0.022	0.883
Subjects, within groups	38	5.265		
Within	40			
Instruction - Frustration Level - B	1	23.115	11.546	0.001
Groups x levels (AxB)	1	0.312	0.156	0.695
Levels x subjects within groups	38	2.002		

Table 12

Cell Means for Degree of Sureness About Accuracy of Responses

	Grade 4 passage	Grade 6 passage	Row means
Average Readers	7.000	5.800	6.40
L.D. Readers	6.950	6.000	6.47

smoothly, and (3) being able to effectively use appropriate corrective strategies in times of perceived miscomprehension. This section of the study was concerned with how effectively average grade four readers and sixth grade learning disabled readers keep track of the success with which their comprehension is proceeding.

While the results obtained in this section were all subsumed under the heading "recognition of miscomprehension", two distinct areas of monitoring were investigated. Scores on the sureness of response task tapped readers' recognition of how well they understood and answered questions. On this measure, no differences were found between the reading achievement groups' ability to monitor their comprehension of questions, but passage level was found to be a significant variable in the ability to monitor comprehension.

Responses obtained at the dots inserted in the passages, on the other hand, tapped readers' recognition of the need to monitor their ongoing comprehension as they read stories. The total monitoring scores obtained on this measure revealed significant differences between the reading achievement groups, but disclosed no significant differences in monitoring across passage levels. Since the total score was comprised of subscores obtained on monitoring of text mechanics, recognition of the need for more information, and monitoring of semantic content, a further breakdown was conducted in order to determine specific areas of difference between the groups. Subscores for monitoring of text mechanics revealed a significant interaction effect wherein average students monitored text mechanics significantly more often than did learning disabled students on the instructional level text, but differences between the groups were not significant on the frustration level text. Subscores for the recognition of the need for more information again revealed no significant effects for passage levels. And, while subscore means on this measure revealed that average readers more frequently than learning disabled readers recognized a need for more information at both passage levels, differences between the groups were not significant. Subscores for monitoring of semantic content revealed no significant differences between either reading achievement groups or passage levels. Subscore means, however, indicated a trend in the expected direction with average readers doing relatively more monitoring of semantic content than did learning disabled readers, and with both groups increasing their monitoring on the frustration level passage.

Hence, while no differences were found between the reading achievement groups on a measure of monitoring of answers to comprehension questions, significant differences between groups were obtained on some measures which assessed the recognition of miscomprehension while reading stories. Passage difficulty was found not to significantly influence the degree of monitoring while reading stories, although subscore means revealed that both reading achievement groups monitored the semantic content of passages somewhat more when reading frustration level text. Passage level was found to be a significant variable in readers' ability to judge their comprehension of questions on the sureness task.

Several researchers, amongst them Garner (1980, 1981), Paris and Myers (1981), Winograd and Johnston (1982), Hare (1981), and Kotsonis and Patterson (1980), have investigated differences in the ability of good and poor readers to recognize when they have not understood.

Good readers have generally been more successful in this aspect of monitoring. The results of this study, however, indicated that while the reading achievement groups differed on some measures of the recognition of miscomprehension while reading passages, they did not differ in all aspects of the recognition of comprehension. A common finding of previous studies has been that poor readers are more concerned with incomprehensible words than they are with the meaningful content of passages. In this study, word level monitoring was categorized as "mechanical" and the results were submitted to a two-way analysis of variance with repeated measures across passage levels. Previous findings were not supported. Average readers in this study produced significantly more word level monitoring (p .01) than did learning disabled readers on the instructional level passage, and while the learning disabled readers produced relatively more word level monitoring at frustration level, the groups did not significantly differ.

Another common finding of these studies is that poor readers are less sensitive than good readers to their failure to comprehend meaning across text. Clear support for these findings was not found. While subscore means indicated that average readers monitored semantic information more frequently than did learning disabled readers, differences between the groups did not reach the .05 level of significance set for this study. Previous research also found poor readers to be inferior in their ability to recognize when they had enough information or had supplied an incorrect response. In this study, support for these findings was not found. Subjects were asked to assess the accuracy of each of their responses to questions, and the results were submitted to a two-way analysis of variance with repeated measures across passage levels. No differences between groups were found. Differences were found, however, between the ability of readers to judge the accuracy of their responses on instructional and on frustration level passages. Since in the majority of previous studies, poor readers were given frustration level text to read, the effect of passage levels may account for an apparent conflict of results in this study with those of previous research.

Several theorists including Paris and Myers (1981), Pace (1981), and Hare (1981) compared readers' awareness of not having understood when reading easier and more difficult texts. The results of these studies clearly indicate an increase in the frequency of monitoring when reading difficult text. Clear support for these findings was not found in the present study. Although a trend was noted wherein readers increased their monitoring of semantic information on the frustration level passage, differences in the levels of monitoring did not reach statistical significance. Scores on the level of monitoring of text mechanics, and for the recognition of the need for more information also did not significantly differ across passage levels. Previous researchers also found readers of all ages to be less able to judge the accuracy of their comprehension when reading frustration level text. The results of this study were consistent with these findings. Both reading achievement groups were significantly less able to judge the accuracy of their responses to questions on the frustration than instructional level passages.

Knowledge of a Lookback Strategy

Each of hypotheses 1, 2 and 3 was concerned with subjects' knowledge of a lookback strategy. A variety of methods were employed to assess this component of average and learning disabled readers' comprehension monitoring skills.

1. An assessment was made of subjects verbal knowledge of a lookback strategy.
2. Subjects functional knowledge of the strategy under spontaneous conditions was measured and the results submitted to a two-way analysis of variance with repeated measures across passage levels.
3. Subjects' functional knowledge of a lookback strategy when reading instructional level material, under cued conditions was measured. A t-test was used to determine whether there were significant differences between groups on this measure.

Qualitative data was used where applicable to advance or support these quantitative analyses.

Hypotheses

1. There is no significant difference between average and learning disabled readers on monitoring as indicated by:
   b. knowledge of a lookback strategy
      i. functional knowledge under spontaneous conditions
      ii. functional knowledge under cued conditions.
2. There is no significant difference between performance on instructional and frustration level materials on monitoring as indicated by:
   b. functional knowledge of a lookback strategy under spontaneous conditions.
3. There is no significant interaction effect between reading achievement and level of material on monitoring as indicated by:
   b. functional knowledge of a lookback strategy under spontaneous

conditions.

Results

Verbal Knowledge of a Lookback Strategy. When asked how they could correct erroneous responses or check answers which they were unsure of, all of the learning disabled readers and 85 percent of the average readers supplied a reread strategy. While these results were not submitted to a statistical analysis because of lack of variation among subjects on this variable, they do reveal that both reading groups under study possessed good verbal knowledge of a lookback strategy, with older learning disabled readers being somewhat more knowledgeable than younger average readers. However, while all but a total of three subjects participating in this study displayed verbal knowledge of a lookback strategy, four subjects never used a lookback strategy under the spontaneous condition, and five more used it only once over the entire session. Furthermore, an examination of the response sheets of the three children who had not been able to verbally suggest a lookback strategy to correct miscomprehension revealed that while one of these subjects did not use the strategy, the other two applied it to answer 33 percent and 50 percent of all lookback questions through the session. Of the four subjects who never used a lookback strategy, three had verbally suggested using the strategy to monitor their work.

Functional Knowledge of a Lookback Strategy Under the Spontaneous Condition. Results from the measure of subjects' functional knowledge of a lookback strategy in the spontaneous condition were submitted to a two-way analysis of variance with repeated measures across passage levels. The results of this analysis are provided in Table 13, and the

Table 13

Two-Way ANOVA With One Factor Repeated For Functional Knowledge of a Lookback Strategy

Source of Variation	df	MS	F	P
Between				
Groups - A	1	0.313	0.273	0.605
Subjects, within groups	38	1.147		
Within				
Instruction - Frustration Level - B	1	1.513	2.877	0.098
Group x levels (AxB)	1	0.012	0.024	0.878
Levels x subjects within groups	38	0.526		

Table 14

Cell Means For Knowledge of a Lookback Strategy

	Grade 4 Passage	Grade 6 Passage	Row Means
Average Readers	1.20	1.50	1.35
L.D. Readers	1.35	1.60	1.47

cell means are given in Table 14. Main effects for groups and for passage levels did not reach the .05 level of significance set for this study, although a trend was noted wherein more use was made of a lookback strategy on the difficult passage. The interaction effect of groups by passage levels was also not significant. Hence, hypotheses 1b.i, 2b and 3b were accepted.

An examination of cell means further revealed that a lookback strategy was spontaneously applied only 33 percent of the time on the instructional level passage and 50 percent of the time on the frustration level passage, suggesting that neither reading achievement group possessed extensive functional knowledge of a lookback strategy. Since the main effects for passage levels had approached significance ($p < .1$) an examination of student response sheets was also conducted and revealed that fewer subjects (six as compared to nine at the instructional level) failed to use a lookback strategy to answer questions on the frustration level passage.

Questions used in this study were also examined on subject response sheets to determine if the nature of specific questions had differentially prompted subjects to use a lookback strategy. The results of this observation indicated a trend in the expected direction. Questions which simply required the rereading of a clearly stated fact (literal questions) prompted 31 and 27 subjects to use a lookback strategy on frustration and instructional level passages, respectively. On the other hand, questions which required the manipulation of information across the story (inferential questions) prompted only 14 and 18 subjects to use the strategy on frustration and instructional level passages, respectively. While these results were not submitted to a statistical analysis, they suggest that the nature of questions used in a reading task may have a bearing on readers' use of a lookback strategy.

Functional Knowledge in the Cued Condition. Since the cued task was used only on the instructional level passage, a t-test was performed to determine whether there were significant differences between average and learning disabled readers in their functional knowledge of a lookback strategy under the cued condition. The results of this analysis are reported in Table 15. No significant differences were found and hypothesis 1b.ii was accepted.

An examination of student response sheets further revealed that 18 subjects (12 learning disabled and six average readers) were prompted to apply a lookback strategy to resolve comprehension failure on one or more questions after being asked "are you sure?", although they had not independently recognized the need to apply the strategy to answer the question. Furthermore, a lookback strategy was used to answer 80 percent of the questions on the cued task as compared to only 33 percent of the time to answer the same questions in the spontaneous condition. In concert, these findings suggest that while children from within the reading achievement groups did not consistently use a lookback strategy independently, they were capable of doing so.

Summary and Discussion of Results

In addition to the recognition of comprehension failure, effective comprehension monitoring involves the generation of plans to improve comprehension, and the implementation of corrective action. Readers' knowledge of corrective strategies with which to ensure that the comprehension process continues smoothly has been investigated by numerous researchers and was also an important feature of this study.

Table 15

T-Test For Independent Means Comparing Average and Learning Disabled Readers' Use of a Lookback Strategy Under Cued Conditions

Average Readers		L.D. Readers				
Mean	SD	Mean	SD	df	T-Value	P (Two Tail)
4.7	15.2	4.8	10.6	38	2.06	0.124

In total the results on measures of the knowledge of a lookback strategy indicated that there were no significant differences between average and learning disabled readers' knowledge of the strategy. Both reading achievement groups displayed good verbal knowledge of a lookback strategy, but this was found to be a poor indicator of their functional knowledge. Both reading achievement groups were found to have poor functional knowledge of a lookback strategy although their use of the strategy increased under cued conditions suggesting that they are capable of doing more monitoring than they do independently.

Significant differences for passage levels in the use of a lookback strategy to monitor comprehension were not obtained, although a trend was noted in which the strategy was used more on the frustration than on the instructional level passage. A count of each reading achievement groups' frequency of lookback strategy use to answer literal and inferential questions provided some indication that the nature of questions asked may also influence the use of a lookback strategy.

Paris and Myers (1978, 1981), Gambrell and Heathington (1981), Hare and Smith (1982), and Hare (1981) used a variety of interview paradigms to compare a wide age range of good and poor readers' metacognitive awareness of comprehension monitoring strategies. Their findings consistently indicate that poor readers of all ages are deficient in their knowledge about corrective strategies. These findings were not supported by this study. Average fourth grade and learning disabled sixth grade readers were asked to indicate what strategy they could use to correct incorrect responses or check answers of which they were unsure. One-hundred percent of learning disabled, and 85 percent of average readers spontaneously verbalized a re-read strategy. A possible explanation for these conflicting results is the concrete context of the task in this study. The findings of previous metacognitive awareness studies have generally been based on the reactions of readers to hypothetical reading situations, or to deliberately altered text, and findings may not have been representative of their knowledge in a real reading situation. Since in this study the task and materials closely resembled a real classroom situation, the children, especially the learning disabled readers, may have been in a better position to identify the nature of the task and make the correct association to their prior knowledge. Secondly, while previous investigations have generally been concerned with a wide spectrum of corrective strategies, this study was limited to a lookback strategy which is the most commonly reported by both good and poor readers. Had a different or wider variety of strategies been investigated, previous findings might have been confirmed.

Other research has been directed towards establishing connections between what readers' say they do (verbal knowledge), and what they really do (functional knowledge). Research in this area is conflicting. Hare (1981), Hare and Smith (1982), and Paris and Myers (1981), found that as early as grade four, readers who possess a strong verbal knowledge of strategies also use a wider variety of corrective strategies, and implement them more frequently than do poor readers whom they found lack such knowledge. Garner and Reis (1981) however, investigated good and poor readers' knowledge of a lookback strategy, and concluded that while young readers reported using a lookback strategy, their functional knowledge of the strategy did not develop until grade eight, and that even at this level, poor readers seldom used a lookback strategy to monitor their comprehension.

In the present study, no significant differences were found between average and learning disabled readers in lookback strategy use in either spontaneous or cued conditions. Partial support was obtained for Garner and Reis' findings, however, since the strategy was spontaneously applied only 33 percent of the time at instructional level.

Still other researchers, including Paris and Myers (1981) and Baker (1979) found, that under cued conditions functional knowledge of a lookback strategy increased dramatically, suggesting that "although many students are capable of comprehension monitoring, they don't always do it on their own initiative" (Baker, p. 372). The results of this study support these findings, thus adding to the accumulating evidence that once functional knowledge of a strategy is acquired, it cannot be assumed that readers in the elementary grades will independently use it.

Pace (1981) investigated fourth and sixth grade readers' comprehension monitoring of instructional and frustration level text, and concluded that the perceived difficulty of a passage influences the extent to which readers attend carefully to what they are reading and use a lookback strategy in a deliberate effort to check on their understanding. Paris and Myers (1981), Hare (1981) and Hare and Smith (1982) also found that difficult text prompted readers of various ages to make greater use of corrective strategies. Clear support for these findings was not secured from the present study although a trend was noted in the expected direction.

In addition to passage difficulty, Pace (1980) and Wonnocott and Raphael (1983) found that the relative difficulty of questions also influenced the degree to which readers were able to benefit from a lookback strategy. Qualitative data obtained from student response sheets provided some support for these findings.

Effective Use of a Lookback Strategy To Rectify Misunderstanding

Each of hypotheses 1, 2 and 3 was concerned with effectiveness in use of a lookback strategy to correct misunderstanding. Several measures were used to obtain data on this aspect of comprehension monitoring:

1. number of lookback questions correct;
2. percentage score obtained on the cued task;
3. systematic versus haphazard strategy use; and
4. ability to make effective use of located information.

A two-way analysis of variance with repeated measures across passage levels was performed on the number of lookback questions correct and a t-test was conducted on the cued task. Qualitative data secured from student response sheets was used to detect differences in the quality of execution of the strategy, as well as in subjects' ability to use information from instructional and frustration level passages once it was located. The three hypotheses are restated below.

Hypotheses

1. There is no significant difference between average and learning disabled readers on monitoring as indicated by:
   c. effective use of a lookback strategy

i. number of lookback questions correct

ii. percentage score obtained on cued task.

2. There is no significant difference between performance on instructional and frustration level materials on monitoring as indicated by:

   c. number of lookback questions correct.

3. There is no significant interaction effect between reading achievement and level of material on monitoring as indicated by:

   c. number of lookback questions correct.

Results

Number of Lookback Questions Correct. A two-way analysis of variance with repeated measures across passage levels was conducted to determine whether there were any significant differences in the number of lookback questions answered correctly. A representation of this analysis is supplied in Table 16, and the cell means are provided in Table 17.

Main effects for groups and for passage levels failed to reach significance, and the interaction between groups and passage levels also failed to reach significance at the .05 level set for this study. Hence, hypotheses 1c.i, 2c and 3c were accepted.

An examination of the cell means, however, revealed a trend in the expected direction with both reading achievement groups answering more lookback questions correctly on the instructional level passage (33 percent as compared to 24 percent of the questions). Combined with the information that a lookback strategy was used more frequently for the frustration level passage (50 percent as compared to 30 percent of the time at instructional level), this trend suggests that average and

Table 16

Two-Way ANOVA With One Factor Repeated For

Correct Lookback Questions

Source of Variation	df	MS	F	P
Between				
Groups - A	1	0.313	0.273	0.605
Subjects, within groups	38	1.147		
Within				
Instruction-Frustration Level - B	1	1.513	2.877	0.098
Group x level (AxB)	1	0.012	0.024	0.878
Levels x Subject within groups	38	0.526		

Table 17

Cell Means for Correct Lookback Questions and for

Use of a Lookback Strategy

Achievement Group	Correct Lookback Questions		Use of A Lookback Strategy	
	Grade 4 Passage	Grade 6 Passage	Grade 4 Passage	Grade 6 Passage
Average	0.950	0.700	1.20	1.50
L.D. Readers	1.000	0.750	1.35	1.60

learning disabled readers were less able to effectively monitor their comprehension with a lookback strategy when answering questions on the frustration level passage. The effect of these combined factors is represented in Figure 4.

Since no major differences were found between groups, an examination was conducted of individual performances within groups. It was expected that individual performances within the average group would be fairly homogeneous, and that a wider variation would be evident in the learning disabled sample. These expectations were not confirmed. However, while performance profiles across groups did not differ, a wide variation of profiles within both groups was evident. At one extreme, several children always used a lookback strategy while at the other extreme, four children never used a lookback strategy under the spontaneous condition and five more used it only once over the entire session. In the cued condition, four of these nine readers did use a lookback strategy effectively, while five either never looked back or did so haphazardly and ineffectively.

Percentage Scores on the Cued Task. A cued task was used on the instructional level passage. Subjects were given a percentage score which was calculated by totalling the number of times that they had used a lookback strategy on this task and determining what percentage of their responses to these questions were correct. These scores were submitted to a t-test in order to determine whether there were any significant differences between the groups. This analysis is represented in Table 18. The results did not reach the .05 level of significance set for this investigation and hence hypothesis 1c.ii was accepted.

Systematic Versus Haphazard Strategy Use. Since in the pilot study

Table 18

Results of a T-Test Comparing Average and Learning Disabled Readers' Percentage Scores on a Cued Task

Average Readers		L.D. Readers				
Mean	SD	Mean	SD	df	T-Value	Probability (Two Tail)
58.350	33.813	47.350	37.820	38	1.25	0.630

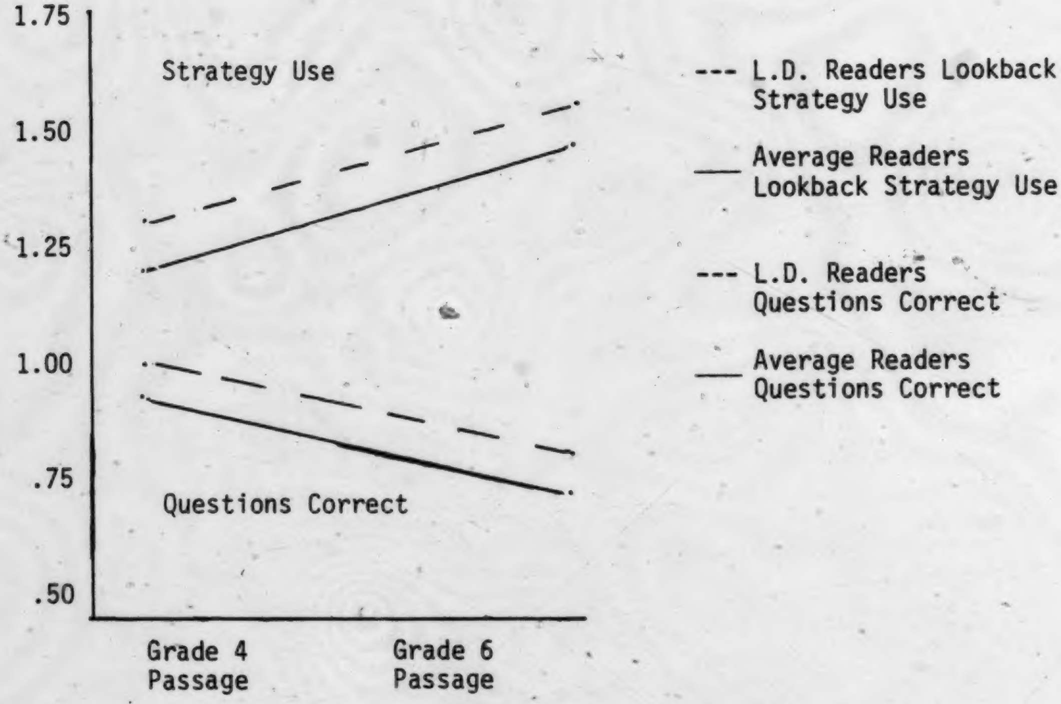

Figure 4. Combined Effects of Lookback Strategy Use and Lookback Questions Correct

a wide variation in the way subjects executed a lookback strategy had been observed, notes were taken each time the strategy was applied in the real testing session. These notes were later used as qualitative data in order to determine to what extent average fourth, and learning disabled sixth graders were systematic or haphazard in their use of a lookback strategy. Subjects were considered systematic in the use of a lookback strategy when they used an organized approach to locating information. For instance, organized strategy users might, (a) go directly to the desired information, or (b) quickly skim through one or two pages until the necessary information was located. Haphazard strategy users, on the other hand, generally (a) looked at bits of text in one page after another often returning to the same page several times, or (b) re-read the entire story from the beginning each time they used the strategy.

A count was made of the number of times each subject used the strategy at each passage level, and of how many times he/she had been systematic in its execution. These data revealed that the average group used a lookback strategy a total of 24 times at the instructional level and were systematic in 19 of these attempts. At frustration level, the average group used a lookback strategy a total of 29 times, and were systematic in their execution of the strategy 28 of these times. The learning disabled group attempted a lookback strategy 27 times on the instructional level passage and were systematic in its execution on 18 trials. At frustration level, they used a lookback strategy a total of 32 times and were systematic on 28 occasions.

Although these results were not submitted to a statistical analysis, it can be seen that both reading groups used the strategy more frequently, and were relatively more systematic in its execution at frustration level. Still, even though readers were more systematic in their execution of a lookback strategy on the frustration level passage, they answered fewer questions correctly at this level. Hence, their ability to use the information once it was located would appear to be an important variable and is considered below.

Use of Located Information. Effective use of a lookback strategy includes the ability to perform the required cognitive processing in order to convert located facts into task appropriate information.

In order to determine how well average fourth and learning disabled sixth graders performed on this variable, a count was made of (a) occasions when each subject used a lookback strategy to successfully locate the necessary information, and (b) of the number of lookback questions correctly answered when a lookback strategy had been used. This analysis revealed that average students were successful in locating the appropriate information 17 times at instructional level and 17 times again at frustration level, but were only able to process this information appropriately to accurately answer a total of 16 questions at instructional level and 12 at frustration level. Learning disabled students located the appropriate information 23 times at instructional level and 18 times at frustration level, but were only able to appropriately process the located information to accurately answer 17 questions at instructional level and a total of 11 questions at frustration level.

An examination of student response sheets further revealed that on the instructional level passage only four students who successfully located information were never able to process the information so as to correctly answer questions. However, on the frustration level passage the number of students who could locate information but were never able to carry out the required processing in order to accurately answer questions increased dramatically to nearly half the sample (17 of 40 subjects).

Although the results of these tabulations were not submitted to a statistical analysis, it was evident that while there were no real differences between groups, passage levels were an important factor in ability of readers to use located information. In sum, although both reading achievement groups used a lookback strategy more frequently at frustration level and were more systematic in its use, they were less effective in using information at frustration level than they were at instructional level. Thus, these data added support to the earlier noted trend wherein readers were less able to effectively monitor their comprehension with a lookback strategy when answering questions on the frustration level passage.

Summary and Discussion of Results

Effective comprehension monitoring must include the ability to use corrective strategies in order to resolve comprehension difficulties. In this section of the study average and learning disabled readers were compared on effectiveness in using a lookback strategy. No significant differences between groups were found on either the number of lookback questions answered correctly, or the percentage scores obtained on a cued task.

The present study was also concerned with the influence of passage difficulty upon readers' effectiveness at monitoring their comprehension through the use of a lookback strategy. The results of one measure which was submitted to a statistical analysis revealed no significant differences in the number of lookback questions answered correctly on instructional and frustration level passages. Several qualitative analyses, however, revealed differences in the effectiveness of a lookback strategy across passage levels, thus providing some evidence that readers are less effective at using a lookback strategy to monitor their comprehension at frustration level.

Hare (1981) and Garner and Reis (1981) investigated good and poor readers' effectiveness at using corrective strategies to monitor their comprehension and found poor readers to be less effective users of corrective strategies. Support for these findings was not obtained from the present study. Average and learning disabled readers were found to be equally effective in using a lookback strategy to monitor their comprehension.

Garner and Reis (1981) further postulated that effectiveness in using strategies develops in stages over time. In studying elementary and junior high aged good and poor readers, they concluded that only the oldest (grade eight) good readers had reached the level of effective users of a lookback strategy. Although younger and poorer readers used the strategy some of the time, they were highly inconsistent in its use, and frequently could not use located information to correctly answer questions. These findings were partially supported by the present study. Although no differences were found between reading achievement groups, the results of this study compared positively with Garner and Reis' elementary aged good reader scores, thus adding support to their conclusion that elementary aged readers are ineffective users of a lookback strategy.

Hare (1981) and Pace (1981) investigated the influence of passage difficulty on readers' effectiveness in using comprehension monitoring strategies. They found passage difficulty to be significantly related to effective strategy use, and concluded that when reading difficult text, readers try harder to monitor their comprehension, but actually are less effective. Although statistical analysis for the number of lookback questions correct across passage levels did not reach the .05 level of significance set for this study, qualitative data secured from students' response sheets provided support for these findings.

Chapter Summary and Discussion

The purpose of this study was to examine the comprehension monitoring abilities of average and learning disabled readers when reading instructional and frustration level text. Investigations were conducted in three areas of comprehension monitoring: (1) the recognition of miscomprehension; (2) knowledge of a lookback strategy; and (3) effective use of a lookback strategy.

The results of the study indicated that average grade four readers were more cognizant than sixth grade learning disabled readers of occasions of not understanding when reading instructional and frustration level passages. Both reading achievement groups were found to be comparable, however, in the recognition of miscomprehension when evaluating the accuracy of their responses to questions. Average and learning disabled readers were also found to be equally knowledgeable of a lookback strategy on measures of verbal knowledge of the strategy and functional knowledge in both spontaneous and cued conditions. The reading achievement groups were additionally found to be equally effective in their use of a lookback strategy to monitor their comprehension. The results of the study further indicated that although both reading groups possessed good verbal knowledge of a lookback strategy, they were inconsistent and largely ineffective in its use. The results of the cued task, however, provided some indication that the readers were capable of monitoring their comprehension with a lookback strategy although they did not independently do so.

The second major focus of this study was to determine whether passage difficulty is a contributing factor to effective comprehension monitoring. Subjects were given one instructional and one frustration level passage to read, and measures of comprehension monitoring were conducted across passage levels.

Statistical analyses disclosed that passage level was a significant factor in the ability of readers to judge the accuracy of their responses to questions. No significant differences across passage levels were obtained on the frequency of monitoring while reading stories, although a trend was evident wherein monitoring of semantic content increased on the frustration level passage. Hence, some evidence was obtained that passage level is a contributing factor to the recognition of miscomprehension. No significant differences for knowledge of a lookback strategy and for effective use of a lookback strategy were obtained on measures which were submitted to a statistical analysis. Qualitative data secured from student response sheets, however, provided evidence that passage levels, as well as the relative difficulty of questions, influenced the frequency of use of a lookback strategy. A trend was also noted wherein readers used a lookback strategy more frequently to answer questions on the frustration level passage, but were less effective in using the located information to correctly answer questions at this level.

The results for passage effects obtained in the present study were in the same direction as those of previously reported research. Any discrepancies from previous research were in the degree of significance obtained on various measures of the effect of passage difficulty on comprehension monitoring. While differences between passage levels in previous studies usually reached statistical significance, the results of quantitative analyses in this study were generally not significant. Several qualitative measures, however, provided support for differences between comprehension monitoring on instructional and frustration level passages. Winograd and Johnston (1982) and Garner (1982) stressed the need for the use of multiple measures in investigations of comprehension monitoring. Differences in results obtained in this study for the effects of passage levels on comprehension monitoring serve to once again underline the importance of using multiple measures in investigations of comprehension monitoring.

Previous research on good and poor readers' comprehension monitoring skills consistently disclosed significant differences between reading achievement groups on all aspects of comprehension monitoring. The results of this study differed from previous investigations in that, while differences were found between reading achievement groups in some areas of the recognition of miscomprehension, the groups did not significantly differ in the recognition of miscomprehension of questions, or in their knowledge of a lookback strategy and effective use of this strategy to monitor their comprehension. Qualitative data secured from student response sheets further supported findings from quantitative analyses. While further research will be needed to explicate discrepancies between the results of this and previous research, some factors which could have contributed to the discrepancies are presented below.

Many of the previous researchers (e.g. Paris and Myers, 1982; and Hare and Smith, 1982) failed to ensure that the material used was at instructional level for the poor readers. Since passage difficulty appears to affect comprehension monitoring, comparisons of good and poor readers in their studies may have been confounded by the effect of passage level with the result that poor readers who read frustration level material monitored their comprehension less well than did good readers who were reading instructional level material. It is possible that, had the effect of passage difficulty not been kept constant for both reading groups in this investigation, previous results would have been replicated.

Previous investigations (e.g. Garner and Reis, 1981; Garner and Anderson, 1982; Winograd and Johnston, 1982; Garner, 1980 and 1981; Gambrell and Heathington, 1981) generally did not control for I.Q. While the effect of intelligence on the ability to monitor comprehension is unknown, it is possible that the degree and extensiveness of differences between reading achievement groups in these investigations was partly the result of differences in general intelligence. Since the present study controlled for intelligence, it seems that when good and poor elementary school-aged readers are equal in intellectual functioning and are reading material of comparable difficulty, they are similar in many aspects of comprehension monitoring.

Finally, the research paradigm selected for the investigation of differences between good and poor readers may, to some extent, color the results. Previous results of good and poor reader differences in the recognition of miscomprehension were based almost exclusively on various error detection paradigms in which errors were deliberately inserted into passages and scores were obtained on the readers' detection of the anomalous information. Since learning disabled and average readers in this study were found to significantly differ in the recognition of miscomprehension when reading stories, previous investigations may have disclosed differences between good and poor readers in one aspect of comprehension monitoring without considering other aspects of this process. Thus, real differences in one aspect of comprehension monitoring taken out of the broader context, where similarities are abundant, might have led investigators to conclude that differences between achievement groups are greater than they really are. Comprehension monitoring appears to be a complex process comprised of a number of discrete subcomponents which develop in stages over time. The investigation of such a complex skill calls for the utilization of a variety of paradigms and the use of multiple measures.

CHAPTER 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS, AND SUGGESTIONS FOR FUTURE RESEARCH

The major purpose of this study was to compare average and learning disabled readers' comprehension monitoring skills at instructional and frustration levels.

Summary of the Study

The sample for this study consisted of 20 fourth grade average readers and 20 sixth grade learning disabled readers selected from schools within the Edmonton Catholic School District on the basis of performance on the Gates MacGinitie Reading Test, Level C, Form 2, Canadian Edition and the non-verbal scores on the Canadian Lorge-Thorndike Intelligence Test, Level B, Form 1. Reading level and I.Q. were held constant for the two groups with reading scores ranging from 3.7 to 4.7.

Each subject was individually tested using two stories which were adapted from the Martin Moony Mystery Casebooks, and typed on three separate pages. Since the effect of reading level upon comprehension monitoring was of interest to the study, each subject was asked to silently read one instructional level (fourth-grade) and one frustration level (sixth-grade) story, and to answer questions about each. Four of the questions from each passage were designed to induce a lookback strategy, and the placement of the story pages in front of the child ensured easy observation of lookback behavior. Subjects were also requested to stop reading and to verbalize any problems which they might be experiencing in reading the text as they reached red dots which had been inserted at selected points within the stories. The results of spontaneous monitoring at the dots, spontaneous use of a lookback strategy to answer questions and cued use of a lookback strategy at instructional level were used to determine each subjects (a) recognition of miscomprehension, (b) knowledge of a lookback strategy, and (c) effective use of a lookback strategy.

The statistical measures used to analyse data included two-way analysis of variance with repeated measures across passage levels and t-tests for independent means. In addition, qualitative data were used when deemed appropriate.

Major Findings and Conclusions

Several major findings were drawn from the analysis of the data collected in this study. The study focussed upon two areas of research: (1) differences between the comprehension monitoring abilities of average and learning disabled readers, and (2) differences between comprehension monitoring of instructional level and frustration level passages. Findings related to each of these areas are presented below.

Differences Between Average and Learning Disabled Readers

Recognition of Miscomprehension. On the first measure of recognition of the failure to comprehend when reading instructional and frustration level passages, red dots were inserted at select points within the passages, and all of the comprehension mointoring which occurred spontaneously at these dots was noted. These data indicated that:

1. Average readers monitored their reading significantly more than did learning disabled readers at these dots.
2. Average readers were more cognizant than learning disabled readers of miscomprehension due to text mechanics when reading the instructional level passage, while the groups did not significantly differ on this measure when reading the frustration level passage.

3. The groups did not significantly differ on their awareness of miscomprehension due to insufficient information, although an examination of cell means indicated that average readers recognized a need for additional information more frequently than did learning disabled readers, and the differences between the groups were greater on the frustration level passage.
4. No significant differences were found between average and learning disabled readers' awareness of miscomprehension due to perceived semantic inconsistencies although an examination of cell means revealed that average readers monitored their comprehension of semantic content relatively more often than did learning disabled readers.

On a second measure of children's recognition of miscomprehension, readers were asked to assess the accuracy of their responses to questions. No differences were found between average and learning disabled readers' recognition of how well they understood and answered questions.

Knowledge of a Lookback Strategy. Several methods were employed to assess average and learning disabled readers' verbal and functional knowledge of a lookback strategy. These data revealed that:

1. Both reading groups possessed good verbal knowledge of a lookback strategy.
2. Verbal knowledge of a lookback strategy provided no indication of readers' functional use of the strategy.
3. No significant differences were found between average and learning disabled readers' functional knowledge of a lookback strategy.
4. Average and learning disabled readers alike were found to be inconsistent and largely inadequate in their functional knowledge of a

lookback strategy. Functional knowledge of a lookback strategy was found to vary widely within each reading achievement group.

5. No significant differences were found between average and learning disabled readers' use of a lookback strategy in the cued condition. Lookback strategy use increased for both groups in the cued condition, suggesting that average and learning disabled readers are capable of using a lookback strategy to correctly answer some questions although they do not independently do so.

Effective Use of a Lookback Strategy to Rectify Misunderstanding. Several measures were used to determine whether there were significant differences between average and learning disabled readers' effectiveness at using a lookback strategy to answer questions. These data indicated that:

1. There were no significant differences in the number of lookback questions answered correctly by average and learning disabled readers.
2. When children were cued to monitor their responses, there were no differences between groups for the number of times a lookback strategy was used to correctly answer questions.
3. Qualitative data revealed that both reading achievement groups were equally systematic in their search for needed information. In addition, there were no real differences between average and learning disabled readers' ability to make use of located information in order to correctly answer lookback questions.
4. While no real differences were found across groups in effective use of a lookback strategy, a wide variation of monitoring abilities was noted within each reading achievement group.

Overall, it was concluded that both reading groups possessed good verbal knowledge of the strategy, but were inconsistent in its use and largely ineffective at locating and using relevant information. Strategy use and efficiency increased on a cued task, suggesting that elementary aged readers may be better able to use a lookback strategy than was indicated by their independent performance in the spontaneous condition.

Differences Across Passage Levels

Recognition of Miscomprehension. Red dots were inserted at selected points within one instructional and one frustration level passage and comments involving comprehension monitoring at these locations were recorded to determine whether there were any differences in the amount of monitoring across passage levels. The results of these data indicated that:

1. There were no significant differences between instructional and frustration level passages on total monitoring produced at the dots, on monitoring due to text mechanics, or on monitoring due to a lack of information.
2. Differences across passage levels for the recognition of miscomprehension due to semantic content did not reach the .05 level of significance, although an observation of cell means indicated a trend wherein both reading achievement groups monitored for semantic inconsistencies relatively more often when reading the frustration level passage.

A second measure of differences between passage levels on the recognition of miscomprehension was obtained by asking readers how sure they were of the accuracy of their responses to questions. The results of these data reached significance, indicating that readers were better able to judge the accuracy of their answers to questions at instructional level.

Knowledge of a Lookback Strategy. Several measures were used to determine whether there were any differences between passage levels on readers' functional knowledge of a lookback strategy. The results of these measures indicated that:

1. There were no significant differences across passage levels for frequency of lookback strategy use, although a trend was noted wherein relatively more use was made of a lookback strategy on the frustration level passage.
2. Qualitative data indicated that the nature of questions influenced lookback strategy use, with literal questions prompting more lookback strategy use than inferential questions.

Effective Use of a Lookback Strategy to Rectify Miscomprehension. Several measures were used to determine whether there were significant differences in readers' effectiveness at using a lookback strategy to answer questions on instructional and frustration level passages. These data indicated that:

1. There were no significant differences between passage levels for the number of lookback questions answered correctly, although a trend was noted wherein relatively more questions were answered correctly on the instructional level passage.
2. Readers were relatively more systematic in their execution of a lookback strategy on the frustration level passage, but never-the-less, answered fewer questions correctly at this level.
3. Readers were less able to make use of located information to correctly answer questions on the frustration level passage. Nearly one-half of the readers in the study were never able to use the information which they located on the frustration level passage in order to correctly answer questions.

Hence, while statistical analyses revealed significant differences between passage levels on only one measure of readers' ability to judge the accuracy of their responses to questions, qualitative data provided some evidence that passage levels as well as the relative difficulty of questions also affect readers' functional knowledge of a lookback strategy and their effectiveness in making use of the strategy to correctly answer questions.

Classroom Implications Emerging From the Study

There are several practical implications to the present research: Support was obtained for the effect of passage levels upon readers' comprehension monitoring. When reading text which was too difficult for them, readers were aware that they were not understanding, but were relatively limited in their capacity to correct their comprehension failures or to predict the accuracy of answers to questions. Modern theories of reading comprehension have provided abundant evidence that the good comprehender is an active reader, who interacts with text constantly monitoring his/her progress and using appropriate strategies to correct comprehension failure as he/she reads. Thus an important implication of this research is the need for classroom teachers to provide students with instructional or independent level materials, which will increase the likelihood of effectively monitoring their comprehension.

Many previous studies which did not control for the level of materials given poor readers, found vast discrepancies between the comprehension monitoring abilities of good and poor readers. A major finding of the present research, however, was that average and learning disabled readers who were matched for I.Q. and reading text of comparable difficulty were similar in most areas of comprehension monitoring. These findings again underline the importance of teachers being knowledgeable about individual students' reading abilities and making the necessary adjustments to accommodate these in the classroom. Informal reading inventories in which graded passages are utilized to measure reading abilities could easily be used to determine individual needs, and ensure that each child is provided with instructional level reading materials.

Since there may be a danger that children who are bombarded with minimally understandable text would learn to accept this and stop trying to make sense of what they read, any efforts undertaken by teachers to ensure that all readers are given instructional level materials would not only have the short term benefit of enabling poor readers to monitor their comprehension as they read, thereby enabling them to achieve the long term goals of developing improved comprehension monitoring skills, but would also mitigate against the possible danger to comprehension monitoring of exposure to frustration level materials over a long period of time.

Some support was obtained for the effect of question types upon readers' use of a lookback strategy to monitor their comprehension. Some students who used a lookback strategy to answer questions requiring only the locating of specific facts (literal questions) did not utilize the strategy to answer those questions requiring the reorganizing or integration of information across a passage (inference questions) suggesting that, once they have acquired knowledge of a lookback strategy, young readers do not automatically use the strategy in all applicable situations. Two valuable teaching implications arose from this finding. Firstly, it appears that some question types will lend themselves more easily than others to the introduction of comprehension monitoring strategies. Secondly, once a strategy is well known in one context, some teaching should be directed towards transferring its use to a variety of reading contexts and materials. Furthermore, since verbal knowledge of a lookback strategy proved to be a poor indicator of children's functional knowledge of the strategy, it will be important for teachers to ensure that children who can talk about strategies have also acquired an appropriate level of competence in their use.

Average grade four and learning disabled grade six students in the present study did not generally use a corrective lookback strategy to monitor their comprehension. A comparison of their performances under a spontaneous and a cued condition, however, suggested that elementary school aged children have a greater capacity for monitoring their comprehension than was apparent by their spontaneous performance. An implication of these results is that elementary aged students could benefit from direct instruction emphasizing the goals of comprehension monitoring. They should be made explicitly aware of the value of comprehension monitoring and, again, instruction in this facet of comprehension monitoring should be consolidated across a wide variety of settings.

Hence, in keeping with modern theories of reading comprehension, instruction in comprehension monitoring should encourage planful, self-guided behavior in readers which will foster a sense of responsibility for their own comprehension. If comprehension monitoring is always done for them by external sources, such as well meaning teachers, computers, or programmed kits, there will be no need for students to monitor their own comprehension even after they have acquired the ability to do so.

Suggestions for Future Research

Several suggestions for future research can be drawn from the present study:

Variations Across Reading Levels

In the present study, while average and learning disabled readers were comparable in most aspects of comprehension monitoring, they differed in the recognition of miscomprehension when reading instruction and frustration level stories. Future research might be directed towards identifying differences and similarities in average and learning disabled readers' comprehension monitoring in a variety of other situations. Such research would be of value to teachers wishing to circumvent and/or remediate the special problems faced by learning disabled readers.

A wide variation of comprehension monitoring abilities was noted amongst subjects within each reading achievement group. Hence, the investigation of differences and similarities between reading achievement groups might be extended to include research into individual differences within reading achievement levels. Such research could facilitate the development of suitable remedial programs for use with all children who have not attained a suitable level of development in aspects of comprehension monitoring.

In the present study average and learning disabled readers were comparable in their knowledge and use of a lookback strategy. Since neither group had attained a high degree of proficiency in using a lookback strategy, however, it might be of value to replicate the study using older children. If differences between the groups were to be found, it is conceivable these would most easily be detected at a point where average readers are using a lookback strategy consistently and effectively.

The present study might also be extended by adding a group of average sixth grade readers to the investigation. Although this study provided some support for the developmental lag theory of learning disabilities, contrasting sixth grade learning disabled readers to both fourth and sixth grade average readers could further test this theory as it applies to comprehension monitoring, while at the same time contributing to the body of knowledge on the development of comprehension monitoring skills in elementary school aged children.

Teaching and Assessing Comprehension Monitoring Skills

This study provided some evidence in support of the influence of task variables (such as question types) upon the use of a lookback strategy to monitor comprehension. A valuable area for future research would be the investigation of optimum conditions under which readers of various ages will attempt to monitor their comprehension through the use of fix-up strategies when reading or answering questions.

Elementary school aged subjects in the present study did not spontaneously use a lookback strategy consistently to monitor their comprehension, although the results of a cued task suggested that they had more capacity for doing so than was apparent in the spontaneous condition. Further research is thus indicated in order to determine whether teaching could promote the independent utilization of known comprehension monitoring strategies. A variety of training strategies could also be investigated in order to determine which are the most useful in helping students to recognize the need for fix-up strategies and independently implementing these as the need arises.

A related area of investigation might include research into the age or grade level at which children begin to use the recognition of miscomprehension as a cue to generate fix-up strategies. Children in the present study were aware that they did not understand questions and could verbalize a means for rectifying the miscomprehension, but they did not consistently do so. Research in this area could lead to valuable insights as to the most suitable time to introduce comprehension monitoring skills to children.

Lastly, more research is needed to continue to devise tasks which effectively elicit and externalize readers' awareness of miscomprehension and their use of corrective strategies so that reliable means of studying comprehension monitoring under various conditions can be found.

Concluding Statement

The ability to monitor one's comprehension when reading is crucial to modern theories of comprehension in which the reader is seen as interacting with the text to achieve his/her comprehension goals. As an active agent in control of his/her own learning, the reader must recognize when he/she has not understood, and be capable of effecting appropriate corrective action when necessary. This study has provided evidence that average and learning disabled elementary school aged readers are similar in most aspects of comprehension monitoring when all are provided with instructional level text. The results of several qualitative measures were found to suggest that frustration level text has a debilitating effect upon readers' comprehension monitoring abilities. It is hoped that teachers will be influenced by these findings to ensure that their students are all provided with appropriate reading materials.

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APPENDIX A

STORIES, QUESTIONS AND INSTRUCTIONS TO SUBJECTS

INTRODUCTION

Hello _ _ _ _ _ _ _ _ _ _ _. My name is Mrs. Thomas. I've been studying at the University this year to learn more about how children of your age read. I've also been visiting a number of schools and seeing a lot of children from grades four, five, and six in order to learn how kids become good readers.

You were chosen from your class to also help me, if you like, by reading two mystery stories and answering a few questions about each. This is not a test, and since it isn't a test you can't pass or fail. In fact you won't be given a grade at all, but if you decide to participate it would really help me a great deal to learn more about how kids your age read. Do you have any questions about what I said? Do you think that you would like to help?

THE CASE OF THE GYPSY FORTUNE-TELLER

"Joey" said Aunt Emily, "I've never seen anything like it! That woman is wonderful!"

Joey was eating his lunch. Aunt Emily was telling him about Madame La Longa. ● She had been in Red Deer only since October 16th. The whole town was talking about how Madame La Longa could tell people what would happen to them in the future. They paid her five dollars and she told their fortunes for ten minutes. ●

"It's a trick," said Joey as he left the table.

"It is not!" said Aunt Emily. "I've been to see her three times. She told my fortune perfectly each time. ● Why don't you come to see her with me today?"

Joey and Aunt Emily went to Madame La Longa's parlor right after lunch. Seven women were already sitting in the small parlor and talking excitedly. "The doctor told my daughter that she will have twins," said Mrs. Young. "They will be born next month." "You must be happy" said Mrs. Green, "my daughter and her children are coming from Calgary next week." "Speaking of Calgary" said Mrs. Coon, "did you hear that my husband has a new job there. We will be moving in three months." ●

The door to another room opened. The women stopped talking. Madame La Longa came in.

Madame La Longa was wearing a long purple dress. She had a bright yellow turban on her head ● and large golden earrings in her ears. Her eyes were large and very dark.

Madame La Longa held her hand out to Widow Peabody. "You are next Mrs. Peabody" she said softly, "let us look into your future. First you must cross my palm with something blue."

Widow Peabody giggled as she put a five dollar bill in the gypsy fortune-teller's hand. Then, they went into the fortune-telling room and closed the door.

Joey looked all around. The women kept talking to each other. He knew the fortune-telling was a trick, but he did not know how Madame La Longa did it.

Ten minutes later Widow Peabody came out. She was smiling and shaking her head. ● "Madame La Longa has done it again," she said. "That gypsy told me I would be going to visit my cousin in Medicine Hat next week. She was right. That's what I plan to do. You remember I told you girls about it right here in this room yesterday." Widow Peabody blushed and added, "She said I might meet a handsome stranger in Medicine Hat." ●

Madame La Longa came out into the middle of the parlor. "I must now wait for five minutes" she said. "The crystal ball needs time to regain its powers." ● The gypsy went back into the fortune-telling room and shut the door.

Five minutes later Madame La Longa came out. Mrs. Lark paid her five dollars and followed her into the little room. Joey sat quietly while Aunt Emily talked with her friends. He was looking for clues.

Joey spotted something strange. He grinned. ● He had discovered how Madame La Longa told her fortunes. There was a round hole in the wall. It was hidden behind a large potted plant and covered with a screen.

Mrs. Lark came out ten minutes later. Then the gypsy fortune-teller went back into her room. Joey stood up and walked behind the potted plant. ●

"I hate to spoil your fun, ladies," he said, "but Madame La Longa is a fake."

"I don't believe it!" Martha Miller said, "please explain yourself Joey." ●

"Madame La Longa," Joey said, "can hear everything that is said in this room. This clever hole in the wall hides a long tube. The tube brings voices to her in the other room. This gives her the information that helps her tell fortunes."

A crash was heard in the next room. Then, footsteps were heard. ● The last sound was the slam of a door. The women ran into Madame La Longa's fortune-telling room. The crystal ball lay in pieces on the floor. The gypsy fortune-teller had left by the back door. Madame La Longa was never seen again in Red Deer.

QUESTIONS GRADE FOUR

Part One

1. How many times did Aunt Emily see Madame La Longa? (non-lookback)

2. Why did Aunt Emily want Joey to come to Madame La Longa's with her? (non-lookback)

Part Two

3. Who told Mrs. Young "You must be happy?" (lookback)

4. What did Madame La Longa mean when she said, "First you must cross my hand with something blue."? (non-lookback)

5. How much money did Madame La Longa get for each minute of fortune-telling? (lookback)

6. How long did it take for the crystal ball to regain its powers? (non-lookback)

Part Three

7. What did Joey discover? (non-lookback)

8. Who might Madame La Longa predict would become a grandmother? (lookback)

9. What was Madame La Longa's dress like? (lookback)

10. Why did Madame La Longa go out the back door - never to return to Red Deer? (non-lookback)

THE TREASURE RIDDLE MYSTERY

It was a cold day in January. Michael decided that it would be nice to sit in front of the fireplace and read. For Christmas his parents had given him a book called Treasure Island which he hadn't read yet. ● It was all about pirates, a treasure map and a boy named Jim Hawkins.

The book had once belonged to a rich but eccentric mystery loving man who had lived in Michael's neighborhood. After he died, his widow had sold many of his things, including his book collection. ● Michael's parents had bought the book from her garage sale.

After supper Michael sat down in front of a crackling fire and read thirty-five pages without stopping. When he turned the next page, a piece of paper fell from the open book onto his lap.

"Hmmmm," Michael said to himself "What's this?" ● This is what was written on the paper:

Treasure Riddle

My secret is in a trunk that's in a hill
It's a dusty place that's dark and still
A big black cannon will be of help to you
Take aim: A special place will come to view
So do not wait and do not fiddle
The answer to my secret is in this riddle.
Julius Capers

Michael's eyes widened ● as he realized that a treasure map had fallen onto his lap.

Michael went to bed with the wintry storm howling around the corners of his house. He fell asleep dreaming of pirates, treasures, and dark hidden places. If only he could solve the mystery of the riddle, it might lead him to a treasure right here in Calgary!

The next morning, Michael decided to share his mystery with his friend Peter.

He showed Peter the treasure riddle. ●

"Let's begin searching," Peter said, "we may end up rich!"

Michael smiled calmly, "Where will we start?" he asked. Both boys reread the riddle.

"The first sentence of the riddle informs us that a trunk is hidden in a hill" ● said Michael. "The second line adds that the secret place is dusty. I believe the treasure trunk has to be hidden in a cave," whispered Michael thoughtfully as he continued to study the clues.

"By Golly! I think you're absolutely right," ● cried Peter, "but how will you locate the cave?"

"There's only one cannon on display in Calgary," replied Michael. "We must begin our search at Dinosaur Park. Get your coat Peter, we have an investigation to conduct."

Forty-five minutes later Michael and Peter got off the bus and found the cannon in Dinosaur Park. The storm had ended but the day was still quite cold. Fortunately, although it was already January, there wasn't much snow on the ground.

"I'm going to sight along the top of the cannon with this telescope," said Michael. "I'll just pretend that I'm taking aim the way my Uncle George taught me."

Michael squinted ● as he looked through the telescope which he had placed on top of the cannon's barrel.

He tilted the cannon upward a bit and aimed in the direction of North Hill. First, he saw a break in a group of spruce trees. Then, barely visible amongst the trees, he spotted a huge rock covered with dead grass and moss.

Michael straightened his back "Ah ha!" he called to Peter, "are you ready for a climb up North Hill?" "You bet" replied Peter. "You make everything incredibly simple. Do you expect we'll find the treasure?"

"There's only one way to find out," smiled Michael. "Let's go!"

It took the boys over two and a half hours to climb to the boulder at which the cannon was pointing. Under the overhanging rock, almost completely hidden by bushes, they saw a small opening. Michael saw that it was an entrance to a cave. He pulled the flashlight from his coat pocket and began to run. "Let's go" he said, "We'll find out in a few minutes if we've solved the riddle."

The boys had to stoop over the get through the opening. Inside the small cave it was dry and quite comfortable.

Peter pointed to a corner of the cave, "look Michael," he exclaimed, "there's the trunk!"

A small dust covered trunk was half buried in the floor of the cave. Michael wiped off the top of the trunk to reveal a message that had been painted in white letters. It said:

> You have solved the Capers Treasure Riddle.
> Open this trunk.
> The treasure belongs to you.
> Congratulations!
> Julius Capers

The boys opened the trunk and found five crisp hundred dollar bills.

QUESTIONS GRADE SIX

Part One

1. Why did Michael dream of pirates, treasures and dark hidden places? (non-lookback)

2. What time of year did this story take place? (non-lookback)

Part Two

3. What is the name of the eccentric man who had previously owned Michael's book Treasure Island? (lookback)

4. What was howling around the corners of Michael's house? (lookback)

5. Who taught Michael how to aim a cannon? (non-lookback)

6. Why had the boys decided to begin their search for the cave in Dinosaur Park? (non-lookback)

Part Three

7. How many lines did the first riddle contain? (lookback)

8. How long did it take the boys to climb to the rock? (non-lookback)

9. Why did the boys want to climb North Hill? (non-lookback)

10. Did Peter live close to Dinosaur Park? (lookback)

INSTRUCTIONS TO SUBJECTS

1. Instructions to samples for thinking aloud task:

We're going to begin with some practise exercises. Sometimes when we read we come upon sentences that don't make sense to us right away. Sometimes we aren't quite sure what the author means because what he's saying doesn't seem right to us. Other times we might feel that we missed something or don't really know how the story line got to where it is. I would like you to read this sample exercise and stop at the dot. ... O.K. Can you tell me if there's anything there that doesn't make sense to you, or that you might be wondering about?

Sample One: The girl ran into the store. She was breathing hard and trying to talk at the same time. ● Mr. Green brought her a glass of water and after a few moments she told him about the bank robber on the corner.

Sample Two: The yellow dog walked quickly towards the kitten, trying hard not to bark or wag his tail. ● Old Yellow had missed his friend since their master gave him to Mrs. Hill who lived down the street. He knew, however, that he must be careful not to arouse suspicion now or his runaway friend would be found.

2. Instructions before the stories were read:

I'm going to give you a story to read. I want you to read silently. You have to read the story all by yourself, and you can take as long as you want to read. Each story is written on three pages but I will give you only one page at a time so that I can ask you a few questions about the story after each page. Here is the first page.

This story is called "The Case of The Gypsy Fortune-Teller" (or, "The Treasure Riddle Mystery". I would like you to stop reading whenever you reach a red dot on the page and tell me anything that you might be thinking or wondering about -- just as you did in the practice exercises. (No prompt was given, nor any attempt made to elicit more than each subject offered spontaneously. If subjects obviously did not understand, however, further clarification was provided.) As each subsequent page was presented, subjects were once again reminded to stop for the dots.

3. Instructions to the Questions:

I'm going to ask you some questions now. If you want to, you can look back at any of the pages you've read before you answer.

Since I'm interested in how sure children are of their answers to questions about what they read, after you answer each question, I'll ask you how sure you are of your answer. This does not mean your answer is wrong -- I'll ask the same question when your answer is correct as when it might not be. If you think your answer is right, just say so; and if you think it's wrong, tell me that too. (Prior to each questioning session, the subject was reminded that he/she could look back on any page to answer the questions.)

4. Instructions to elicit verbal knowledge of a lookback strategy, and to determine the potential for cued strategy use:

If you aren't sure of an answer, or if your answer isn't right, how could you check or correct your answer?

We will now go over some of the questions for which you said that you weren't sure of your answer, or which were not right.

	Repeat Question		Sure?		That's not quite right.		How could you check your ans?		Where would you find the ans?		Can you find it for me?	
	LB	NLB	LB	NLB	LB	NLB	LB	NLB	LB	NLB	LB	NLB
Questions	CI	CI	CI	CI	CI	CI	CI	CI	CI	CI	CI	CI
#												
#												
#												

LB indicates lookback strategy use.
NLB indicates that a lookback strategy was not used.
C indicates a correct response.
I indicates an incorrect response.